

Plugins, Part 1

M I P A V

Medical Image Processing, Analysis, & Visualization

<http://mipav.cit.nih.gov>



Medical Image Processing, Analysis & Visualization & Plugins

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MIPAV Team



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Fellows

Sara Shen

Contractors

Alexandra Bokinsky, Geometric Tools Inc. (Visualization)

Olga Vovk, SRA International Inc. (Technical Writing)

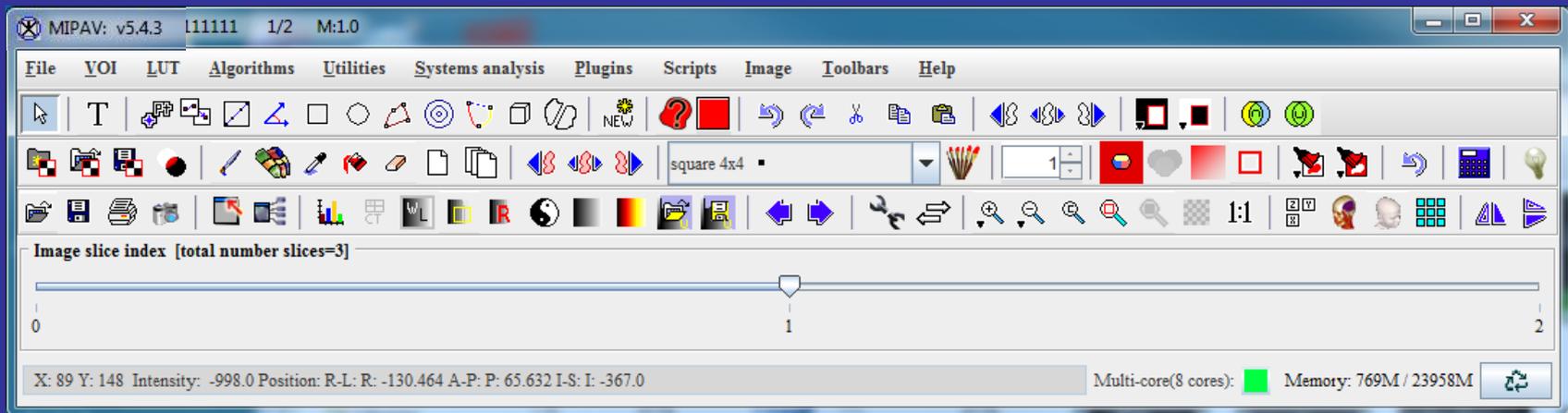
Alumni

Paul Hemler, Agatha Munzon, Nishith Pandya,

Beth Tyrie, Hailong Wang



Mipav Interface



- Options exist
- How to manipulate



File VOI LUT Algorithms Utilities Systems analysis Utilities Systems analysis Plugbars Help

- Autocorrelation coefficients
- Autocovariance coefficients
- Brain tools
- Edge detection
- Image slice index [tot
- Extract surface (marching cubes)
- FFT
- Filters (frequency)
- Filters (Gabor)
- Filters (homomorphic)
- Filters (spatial)
- Filters (wavelet)
- Histogram tools
- Hough transform
- Insight toolkit (auto ITK)
- Microscopy
- Morphological
- Principal component
- Registration
- Segmentation
- Shading correction
- SNR
- Spatial statistics
- Transformation tools
- 4D tools
- Center of mass
- Clone (copy)
- Conversion tools
- Correct image spacing
- Crop
- Fill image
- Flip image
- Generate grid
- Image calculator
- Image calculator - Bulk Images
- Image math
- ImageJ
- Intensity Projection
- Invert
- Match images
- Mosaic to 3D volume
- Noise
- Pad
- Quantify
- Reorientation
- Replace pixel/voxel value
- Rotate
- Slice tools
- Subtract VOI background

Multi-core(8 cores): Memory: 769M / 23958M

Computer > Local Disk (C:) > Program Files

Name	Date
7-Zip	5/6
ActivIdentity	12/
Altiris	11/
Application Verifier (x64)	5/5
Common Files	4/1
Debugging Tools for Windows (x64)	5/5
DVD Maker	7/1
Eclipse	5/1
Eclipse2	9/1
Eclipse3	9/1
Hewlett-Packard	1/1
HPD Software	4/2
HP	5/3
IIS	4/3



Plugins

- PlugInAlgorithm – Develop new functionality and ability to call functions already in MIPAV.
- PlugInFile – Develop files readers to support unique file formats.
- PlugInGeneric – Plugins that do not require an open image.
- PlugInView – Develop new visualizations of datasets.
- PlugIn – ImageJ plugin.



Plugins

- To build a plugin, three files are typically used:
 - PlugInTest.class
 - Interface between MIPAV and plugin.
 - PlugInDialogTest.class
 - Creates dialog for input.
 - PlugInAlgorithmTest.class
 - The actual algorithm.

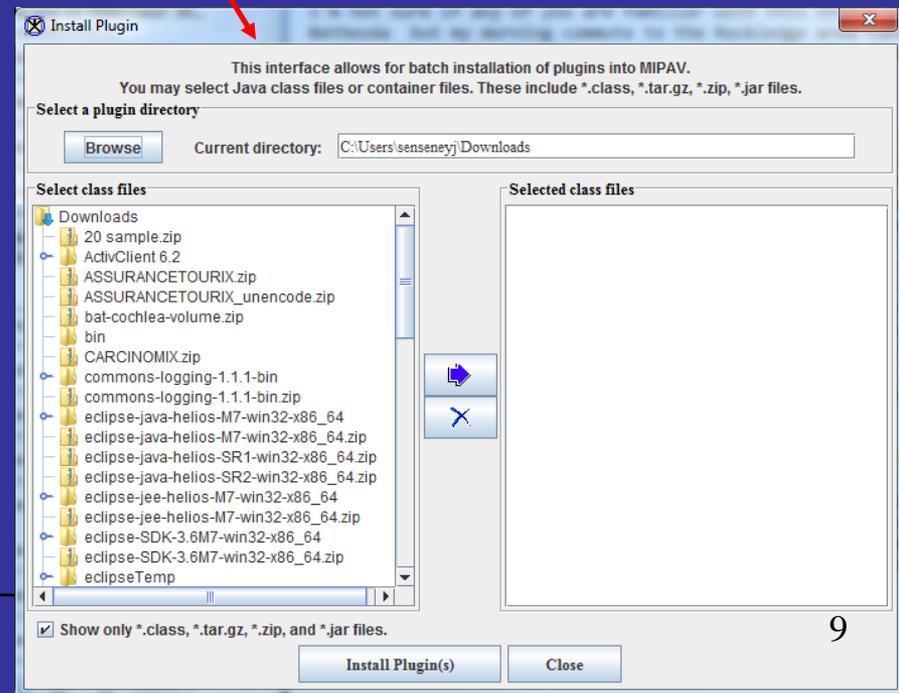
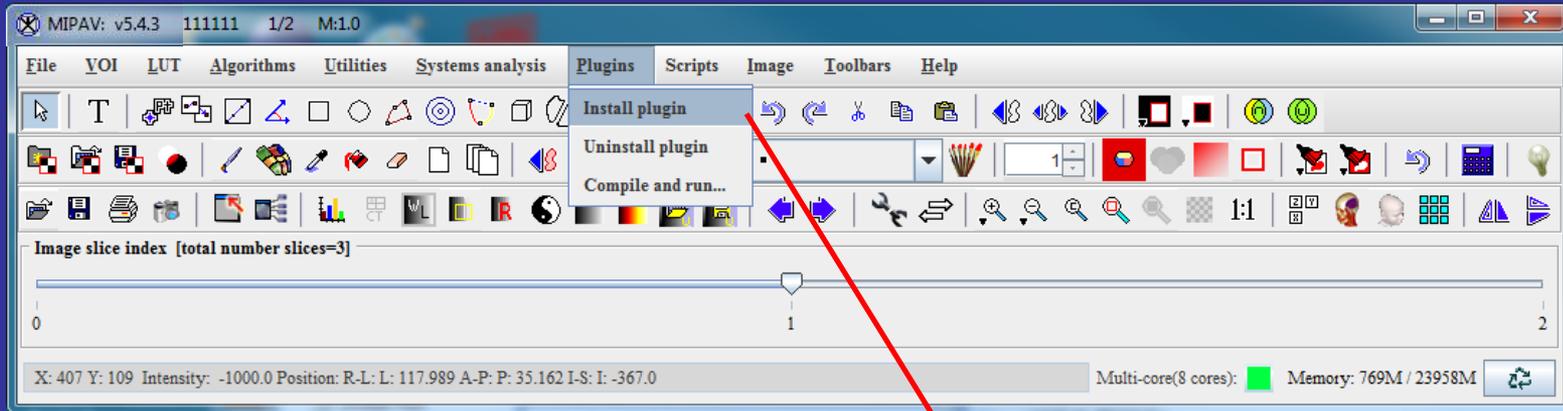


Plugins - Location

- Stored for each user:
 - Windows - C:\Users\{{user_name}}\mipav\plugins
 - Linux/Mac OS - /home/{{user_name}}/mipav/plugins



Plugins - Installing



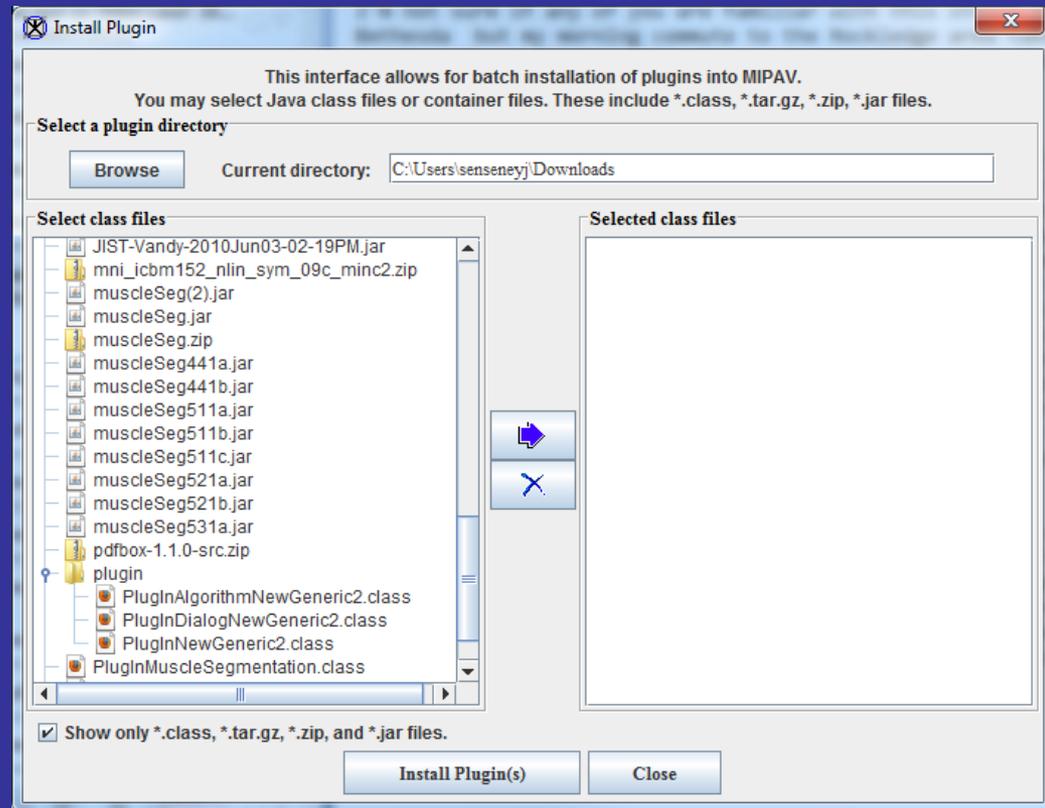
Plugins – Installing

- Installing a plugin (Plugins -> Install Plugin)

Copies files:

- .class
- .jar
- .zip

into user directory.

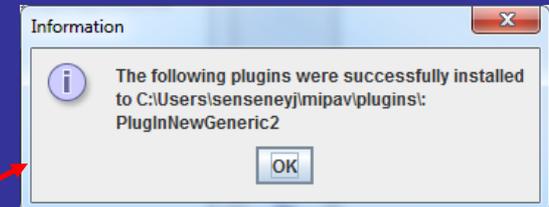
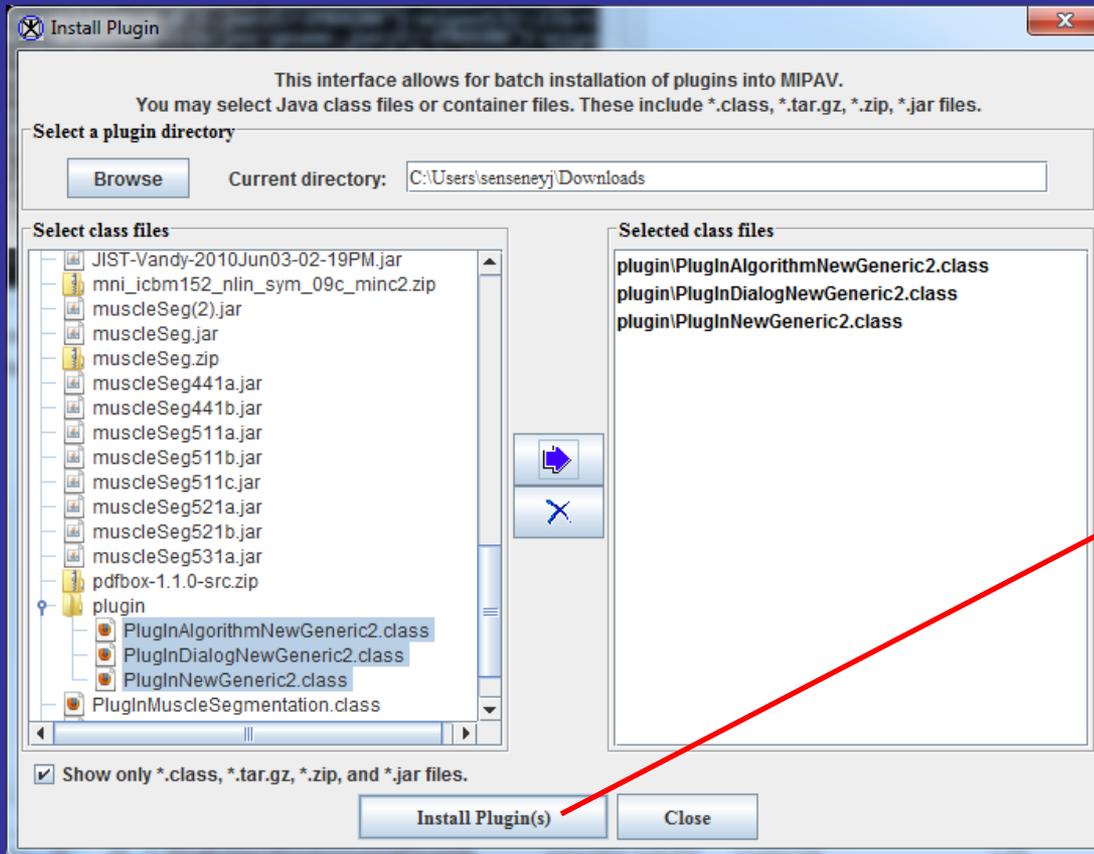


HINT:

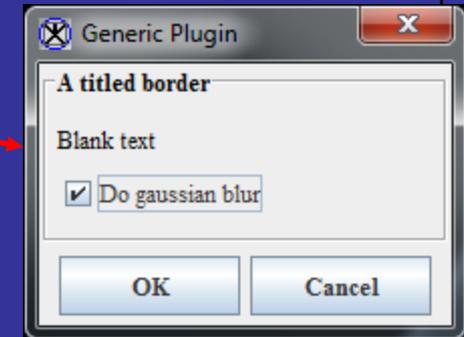
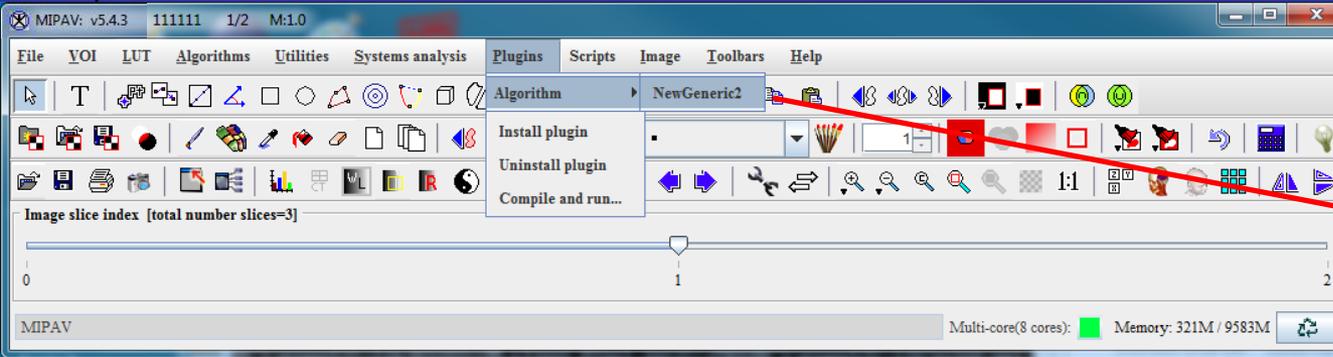
If something goes wrong, just copy the files yourself using locations on Slide 8.



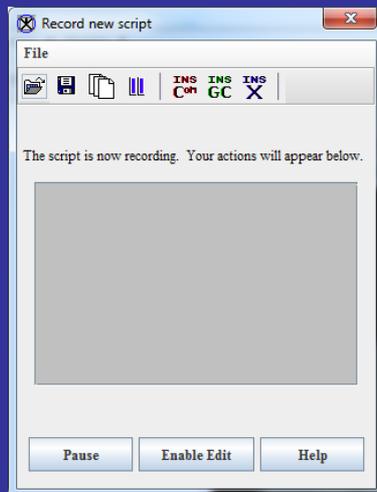
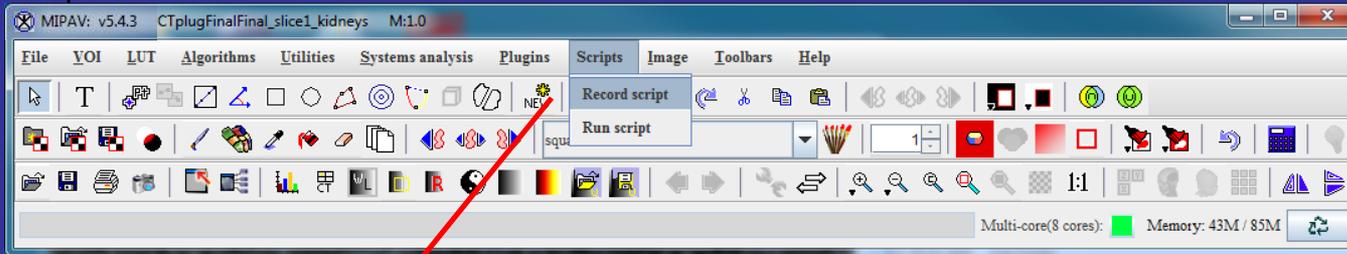
Plugins – Installing (2)



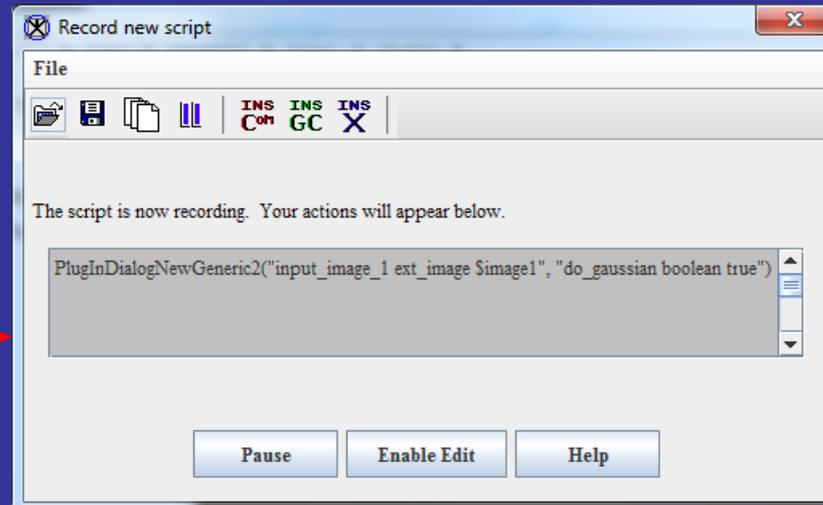
Plugins - Executing



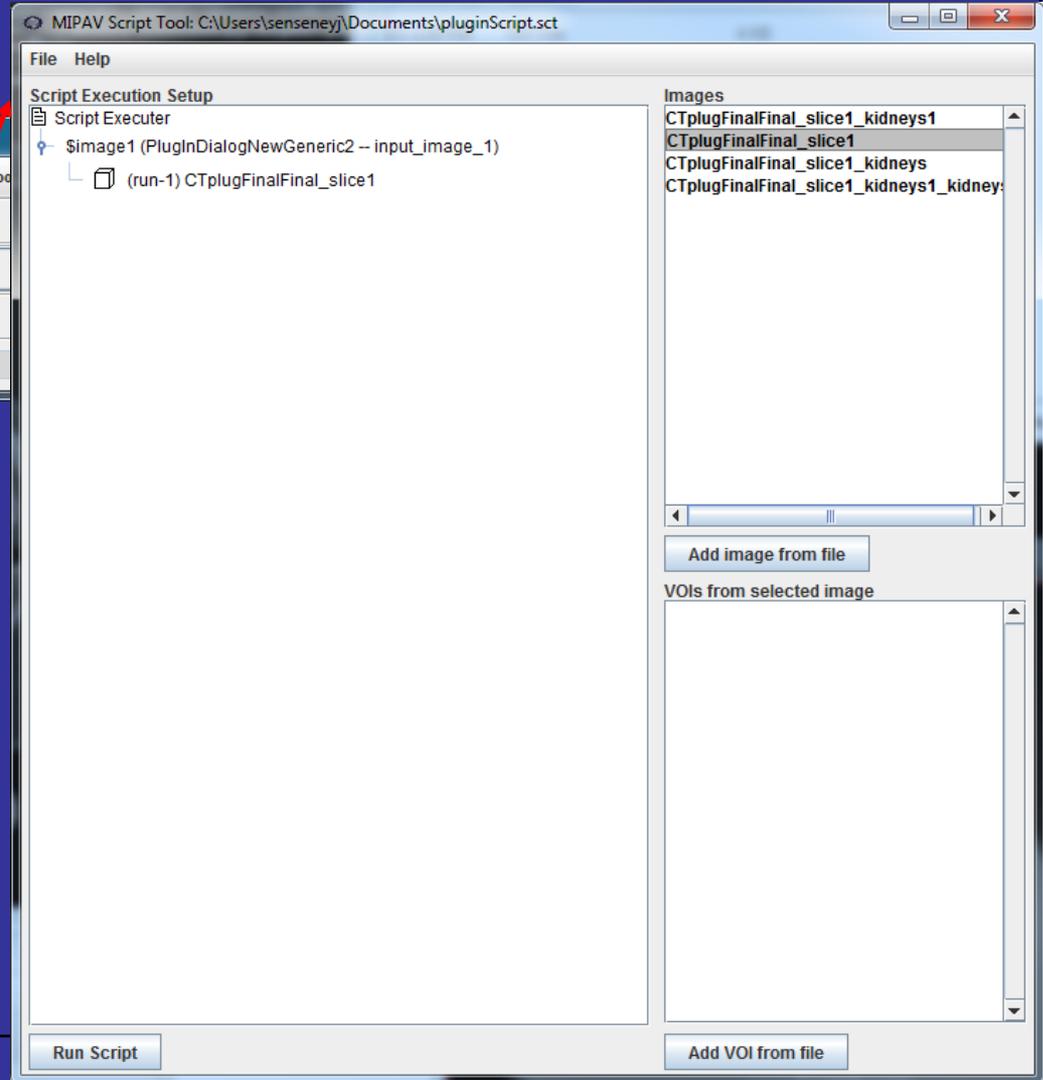
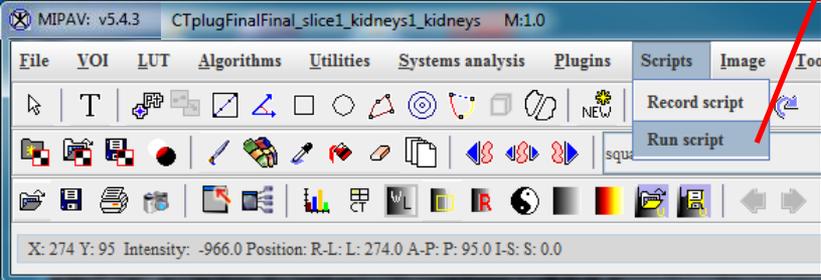
Plugins - Scripting



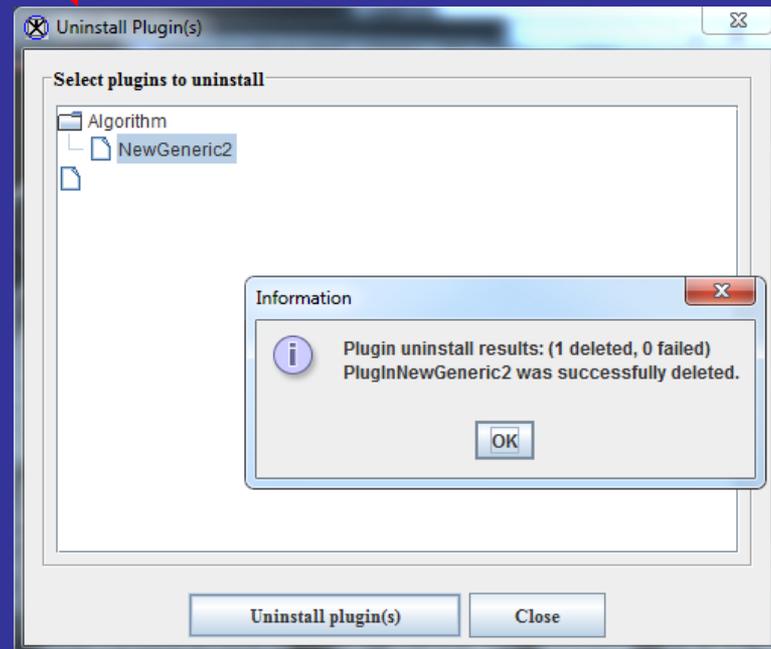
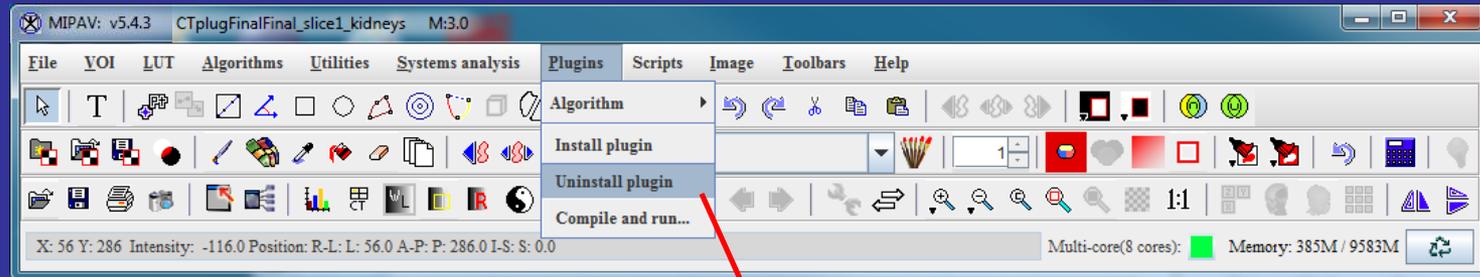
Execute plugin



Script Running Review



Uninstall Plugin



Plugin Lab

- Install

- PlugInCT_MD – already in MIPAV

- MuscleSegmentation –

- <http://dcb.cit.nih.gov/~sensenej/code/muscleSeg.html>

- Bio-Formats -

- <http://dcb.cit.nih.gov/~sensenej/code/bioformats.html>

- ImageJ plugin –

- <http://dcb.cit.nih.gov/~sensenej/code/imagej.html>



Plugins from command line

- Mipav -p Plugin_Name
- Can be run headless



Break - Review

- Plugins
 - File
 - Generic
 - Algorithm
 - View
- Stored in user folder
- Install, Run, Uninstall



Development environment

- Textpad: <http://www.textpad.com/>
 - Simple, few linked files
 - Want to learn Java
- Eclipse: <http://www.eclipse.org/>
 - Many files, libraries
 - Source repository
 - Want to use Java



Download Eclipse

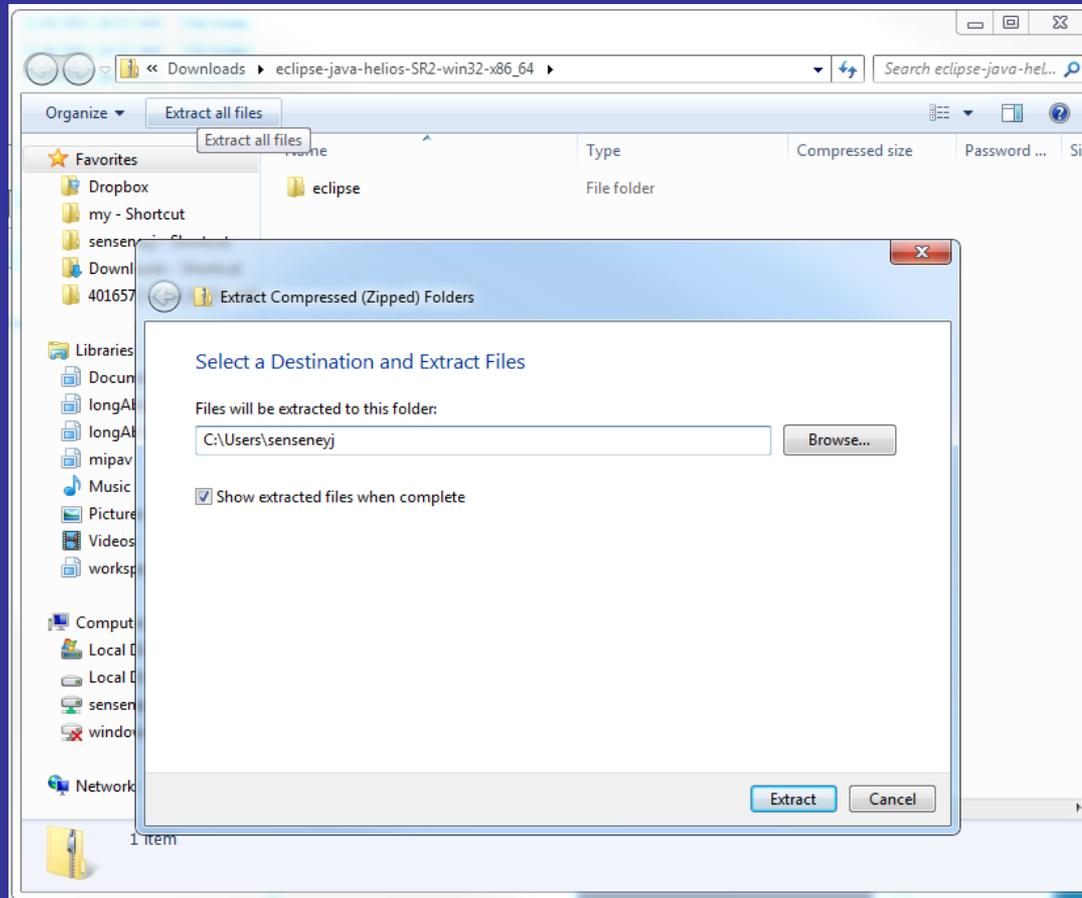
- Download here:

<http://www.eclipse.org/downloads/>

The screenshot shows the Eclipse Downloads page. The main heading is "Eclipse Downloads". Below it are tabs for "Packages", "Developer Builds", and "Projects". Under "Packages", there are sub-tabs for "Compare Packages", "Older Versions", and "Eclipse Helios (3.6.2) Packages for Windows". The "Eclipse IDE for Java Developers" package is highlighted, showing it is 99 MB and has been downloaded 1,478,422 times. To the right of this package, there are download links for "Windows 32 Bit" and "Windows 64 Bit". A red arrow points to the "Eclipse IDE for Java Developers" package, and another red arrow points to the "Windows 64 Bit" download link.

Package	Size	Downloads	Details	Operating System
Eclipse IDE for Java Developers	99 MB	1,478,422	Details	Windows 32 Bit Windows 64 Bit
Eclipse IDE for Java EE Developers	206 MB	1,089,170	Details	Windows 32 Bit Windows 64 Bit
Eclipse Classic 3.6.2	171 MB	822,124	Details	Windows 32 Bit Windows 64 Bit

“Install” Eclipse



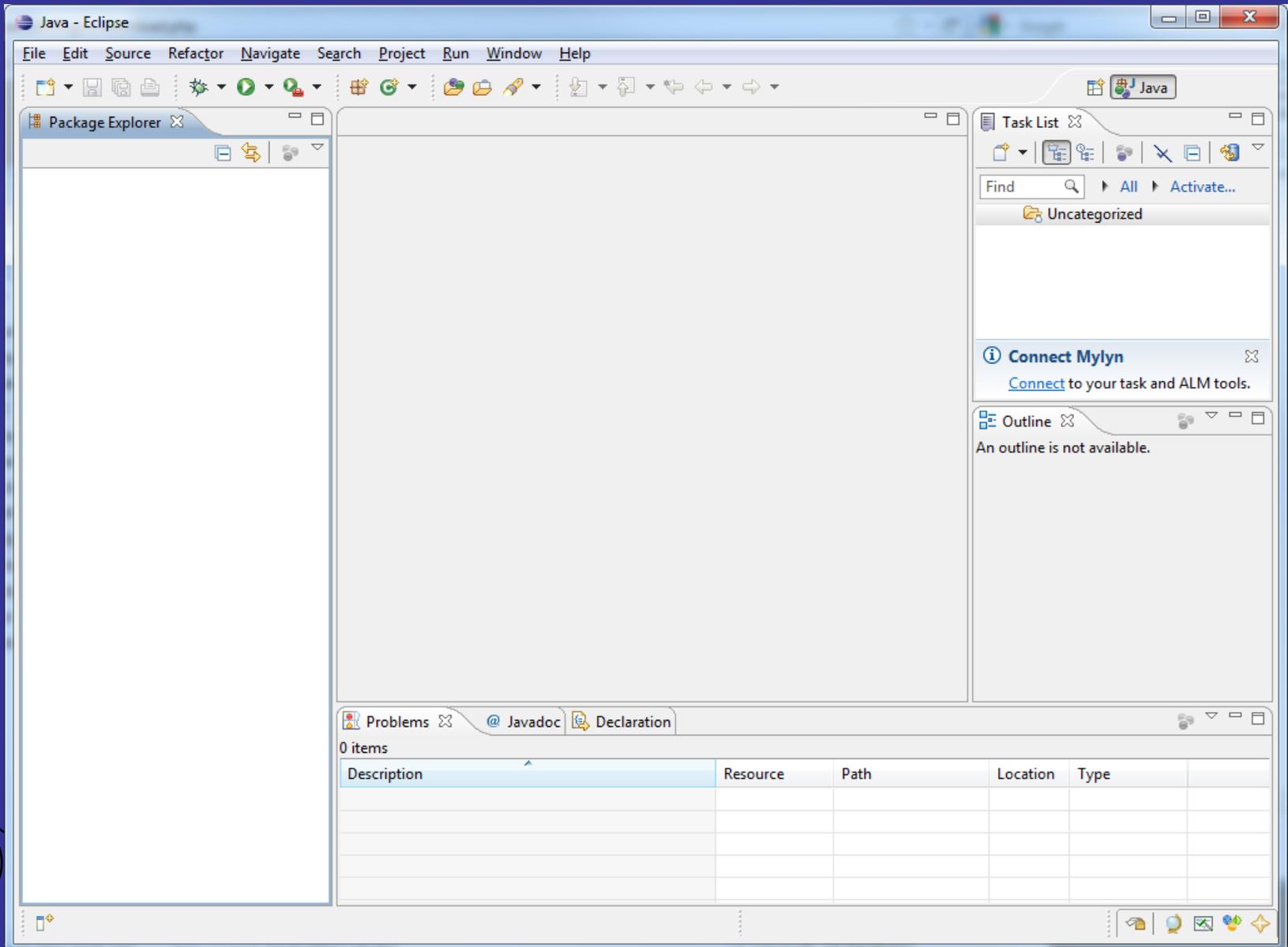
Fix Eclipse

```
-startup
plugins/org.eclipse.equinox.launcher_1.1.1.R36x_v20101122_
1400.jar
--launcher.library
plugins/org.eclipse.equinox.launcher.win32.win32.x86_64_
1.1.2.R36x_v20101222
-product
org.eclipse.epp.package.java.product
--launcher.defaultAction
openFile
--launcher.XXMaxPermSize
256M
-showsplash
org.eclipse.platform
--launcher.XXMaxPermSize
256m
--launcher.defaultAction
openFile
-vmargs
-Dosgi.requiredJavaVersion=1.5
-Xms512m
-Xmx2048m
```

Specify Memory



Start Eclipse



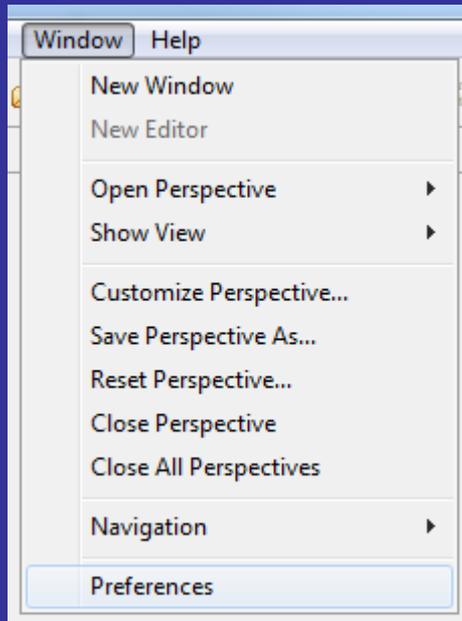
Java Programs

- Virtual machine = platform independent
- JRE to execute

```
cmd Select C:\Windows\system32\cmd.exe
CMD LINE: "C:\PROGRA~1\mipav531\jre\bin\java.exe" -server -classpath "C:\PROGRA~1\mipav531\.;C:\PROGRA~1\mipav531\help\mipav_help.jar;C:\PROGRA~1\mipav531\InsightToolkit\lib\InsightToolkit\InsightToolkit.jar;C:\PROGRA~1\mipav531\lib\JimiProClasses.jar;C:\PROGRA~1\mipav531\lib\jaxp\dom.jar;C:\PROGRA~1\mipav531\lib\jaxp\sax.jar;C:\PROGRA~1\mipav531\lib\jaxp\axalan.jar;C:\PROGRA~1\mipav531\lib\jaxp\xercesImpl.jar;C:\PROGRA~1\mipav531\lib\tar.jar;C:\PROGRA~1\mipav531\lib\jdom.jar;C:\PROGRA~1\mipav531\lib\junit-4.4.jar;C:\PROGRA~1\mipav531\lib\WildMagic.jar;C:\PROGRA~1\mipav531\lib\jj2kpack.jar;C:\PROGRA~1\mipav531\lib\jhall.jar;C:\PROGRA~1\mipav531\lib\ACCESSION_client_UTool.jar;C:\PROGRA~1\mipav531\lib\axiom-api-1.2.4.jar;C:\PROGRA~1\mipav531\lib\axiom-dom-1.2.4.jar;C:\PROGRA~1\mipav531\lib\axiom-impl-1.2.4.jar;C:\PROGRA~1\mipav531\lib\axis2-kernel-1.2.jar;C:\PROGRA~1\mipav531\lib\bcprov-jdk15-136.jar;C:\PROGRA~1\mipav531\lib\commons-codec-1.3.jar;C:\PROGRA~1\mipav531\lib\commons-httpclient-3.0.1.jar;C:\PROGRA~1\mipav531\lib\commons-logging-1.1.1.jar;C:\PROGRA~1\mipav531\lib\jax-gnome.jar;C:\PROGRA~1\mipav531\lib\jaxen-1.1-beta-10.jar;C:\PROGRA~1\mipav531\lib\neethi-2.0.1.jar;C:\PROGRA~1\mipav531\lib\rampart-core-ndar-1.2.jar;C:\PROGRA~1\mipav531\lib\rampart-policy-1.2.jar;C:\PROGRA~1\mipav531\lib\rampart-trust-1.2.jar;C:\PROGRA~1\mipav531\lib\wsdl4j-1.6.2.jar;C:\PROGRA~1\mipav531\lib\wss4j-1.5.2.jar;C:\PROGRA~1\mipav531\lib\wstx-asl-3.2.1.jar;C:\PROGRA~1\mipav531\lib\XmlSchema-1.3.1.jar;C:\PROGRA~1\mipav531\lib\xmlsec-1.4.0.jar;C:\PROGRA~1\mipav531\lib\pdfbox-1.2.0.jar;C:\PROGRA~1\mipav531\lib\jemphbox-1.2.0.jar;C:\PROGRA~1\mipav531\lib\fontbox-1.2.0.jar;C:\PROGRA~1\mipav531\lib\jTEM.jar;C:\PROGRA~1\mipav531\lib\TableLayout-bin-jdk1.5-2009-08-26.jar;C:\PROGRA~1\mipav531\lib\hyperapplet.jar;C:\PROGRA~1\mipav531\lib\lax.jar;C:\Users\sensenevj\mipav\plugins;C:\Users\sensenevj\mipav\plugins\plugins.jar" -Xms10485760000 -Xmx10485760000 MipavMain
```



JRE Setting



Add JRE

The screenshot shows the Eclipse IDE's 'Preferences' dialog box. The 'Installed JREs' tab is selected, displaying a table of installed JREs. The 'Add JRE' dialog box is open, showing the 'JRE Type' selection screen. The 'Standard VM' option is selected in the list of installed JRE types.

Installed JREs

Add, remove or edit JRE definitions. By default, the checked JRE is added to the build path of newly created Java projects.

Installed JREs:

Name	Location	Type	
<input checked="" type="checkbox"/> jre6	C:\Program Files\Java\jre6	Standard VM	

Add JRE

JRE Type

Select the type of JRE to add to the workspace.

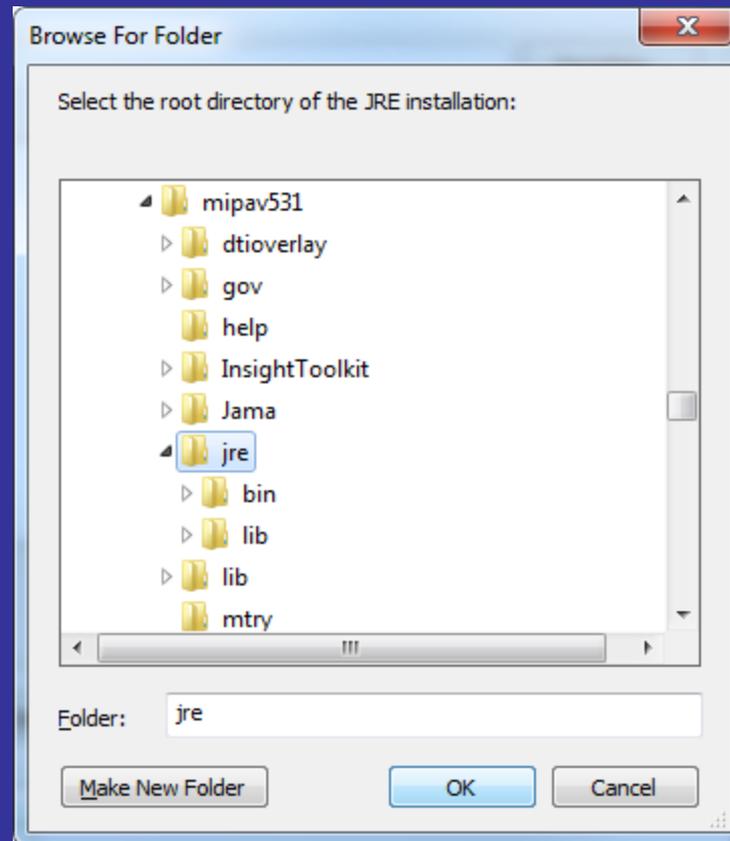
Installed JRE Types:

- Execution Environment Description
- Standard 1.1.x VM
- Standard VM**

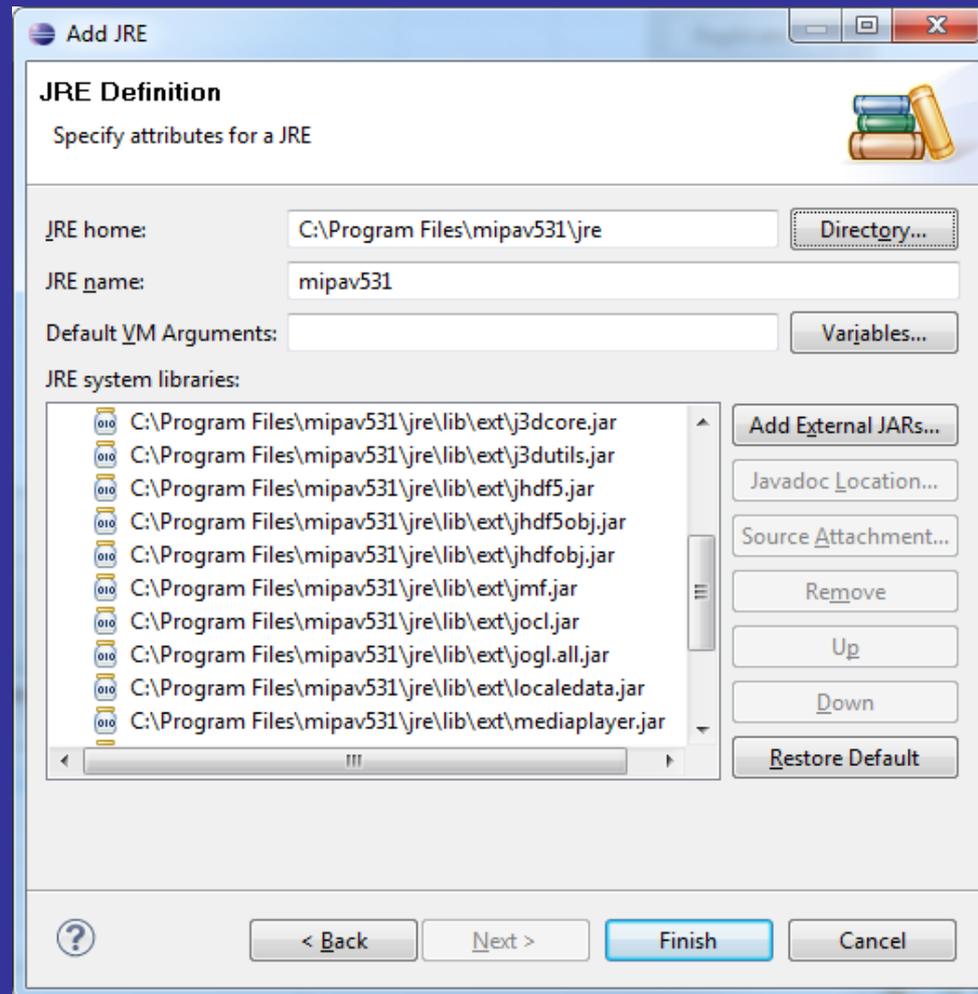
< Back Next > Finish Cancel



Locate JRE



Locate JRE

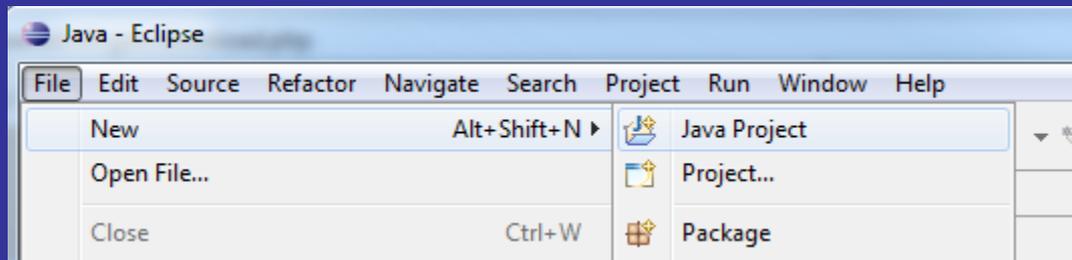


Eclipse project

- Mipav
 - Java project
 - Contains plugins



Make Mipav Project



Make Mipav Project

New Java Project

Create a Java Project

Create a Java project in the workspace or in an external location.

Project name: mipav

Use default location

Location: C:\Users\sensenej\workspace\mipav Browse...

JRE

Use an execution environment JRE: JavaSE-1.6

Use a project specific JRE: mipav531

Use default JRE (currently 'jre6') [Configure JREs...](#)

Project layout

Use project folder as root for sources and class files

Create separate folders for sources and class files [Configure default...](#)

Working sets

Add project to working sets

Working sets: Select...

< Back Next > Finish Cancel

← Specify JRE

Mipav Program

- Execution environment needs to be replicated

```
cmd Select C:\Windows\system32\cmd.exe
CMD LINE: "C:\PROGRA~1\mipav543\jre\bin\java.exe" -server -classpath "C:\PROGRA~1\mipav543\.;C:\PROGRA~1\mipav543\help\mipav_help.jar;C:\PROGRA~1\mipav543\InsightToolkit\lib\InsightToolkit\InsightToolkit.jar;C:\PROGRA~1\mipav543\lib\JimiProClasses.jar;C:\PROGRA~1\mipav543\lib\jaxp\dom.jar;C:\PROGRA~1\mipav543\lib\jaxp\sax.jar;C:\PROGRA~1\mipav543\lib\jaxp\dom.jar;C:\PROGRA~1\mipav543\lib\jaxp\jaxp-impl.jar;C:\PROGRA~1\mipav543\lib\tar.jar;C:\PROGRA~1\mipav543\lib\jdom.jar;C:\PROGRA~1\mipav543\lib\junit-4.4.jar;C:\PROGRA~1\mipav543\lib\WildMagic.jar;C:\PROGRA~1\mipav543\lib\jj2kpack.jar;C:\PROGRA~1\mipav543\lib\jhall.jar;C:\PROGRA~1\mipav543\lib\ACCESSION_client_VTool.jar;C:\PROGRA~1\mipav543\lib\axiom-api-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axiom-dom-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axiom-impl-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axis2-kernel-1.2.jar;C:\PROGRA~1\mipav543\lib\bcprov-jdk15-136.jar;C:\PROGRA~1\mipav543\lib\commons-codec-1.3.jar;C:\PROGRA~1\mipav543\lib\commons-httpclient-3.0.1.jar;C:\PROGRA~1\mipav543\lib\commons-logging-1.1.1.jar;C:\PROGRA~1\mipav543\lib\jax-gname.jar;C:\PROGRA~1\mipav543\lib\jaxen-1.1-beta-10.jar;C:\PROGRA~1\mipav543\lib\neethi-2.0.1.jar;C:\PROGRA~1\mipav543\lib\rampart-core-ndar-1.2.jar;C:\PROGRA~1\mipav543\lib\rampart-policy-1.2.jar;C:\PROGRA~1\mipav543\lib\rampart-trust-1.2.jar;C:\PROGRA~1\mipav543\lib\wsdl4j-1.6.2.jar;C:\PROGRA~1\mipav543\lib\wss4j-1.5.2.jar;C:\PROGRA~1\mipav543\lib\wstx-asl-3.2.1.jar;C:\PROGRA~1\mipav543\lib\XmlSchema-1.3.1.jar;C:\PROGRA~1\mipav543\lib\xmlsec-1.4.0.jar;C:\PROGRA~1\mipav543\lib\pdfbox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\jemphox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\fontbox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\jTEM.jar;C:\PROGRA~1\mipav543\lib\TableLayout-bin-jdk1.5-2009-08-26.jar;C:\PROGRA~1\mipav543\lib\hyperapplet.jar;C:\PROGRA~1\mipav543\lib\javac.jar;C:\PROGRA~1\mipav543\lib\ij.jar;C:\PROGRA~1\mipav543\lib\core_dictionary-4.1.1.8.jar;C:\PROGRA~1\mipav543\lib\dataDictionaryClient-4.1.1.8.jar;C:\PROGRA~1\mipav543\lax.jar;C:\Users\sensenevj\mipav\plugins;C:\Users\sensenevj\mipav\plugins\plugins.jar" -Xms2936012800 -Xmx2936012800 MipavMain
```



Execution environment

- Classpath
 - Libraries - jars
 - Associated class files
- Memory – used by VM
- Launching class file

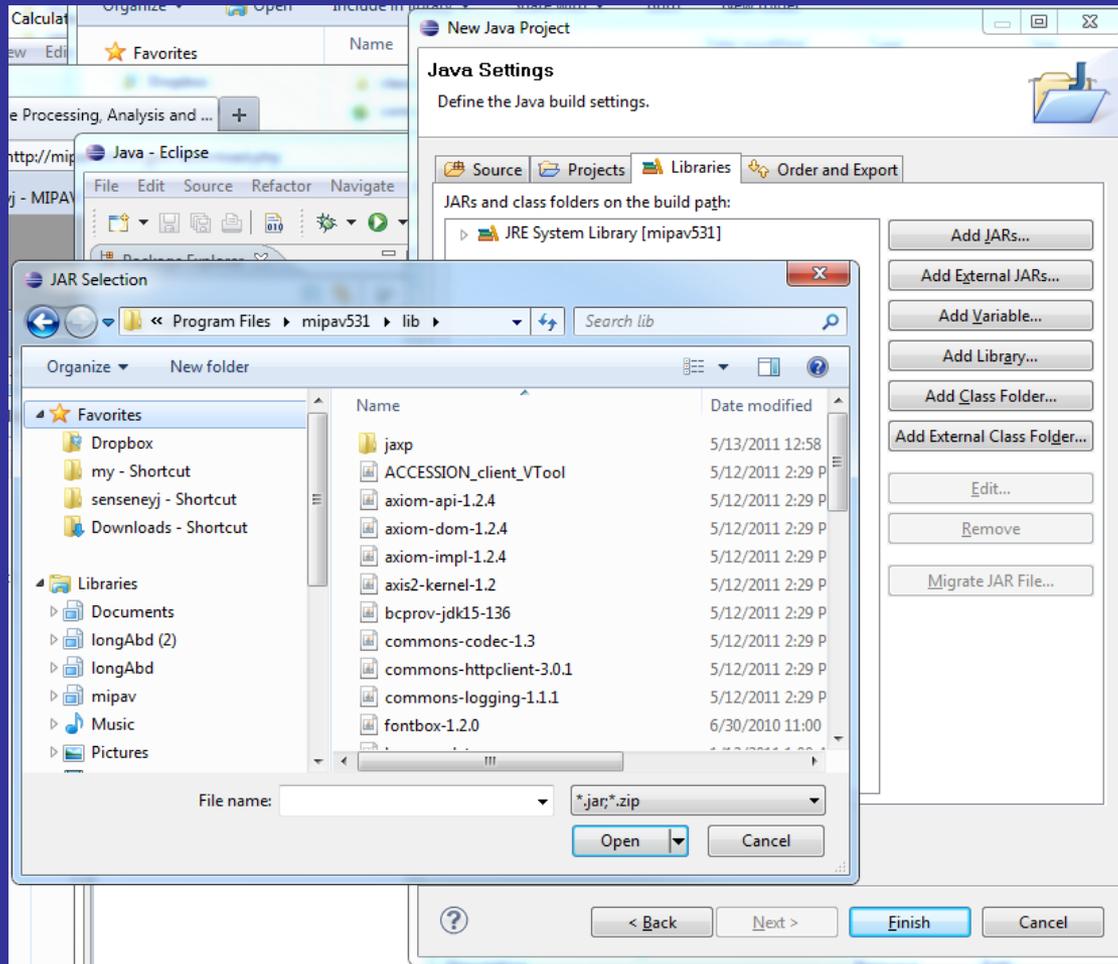


Jars

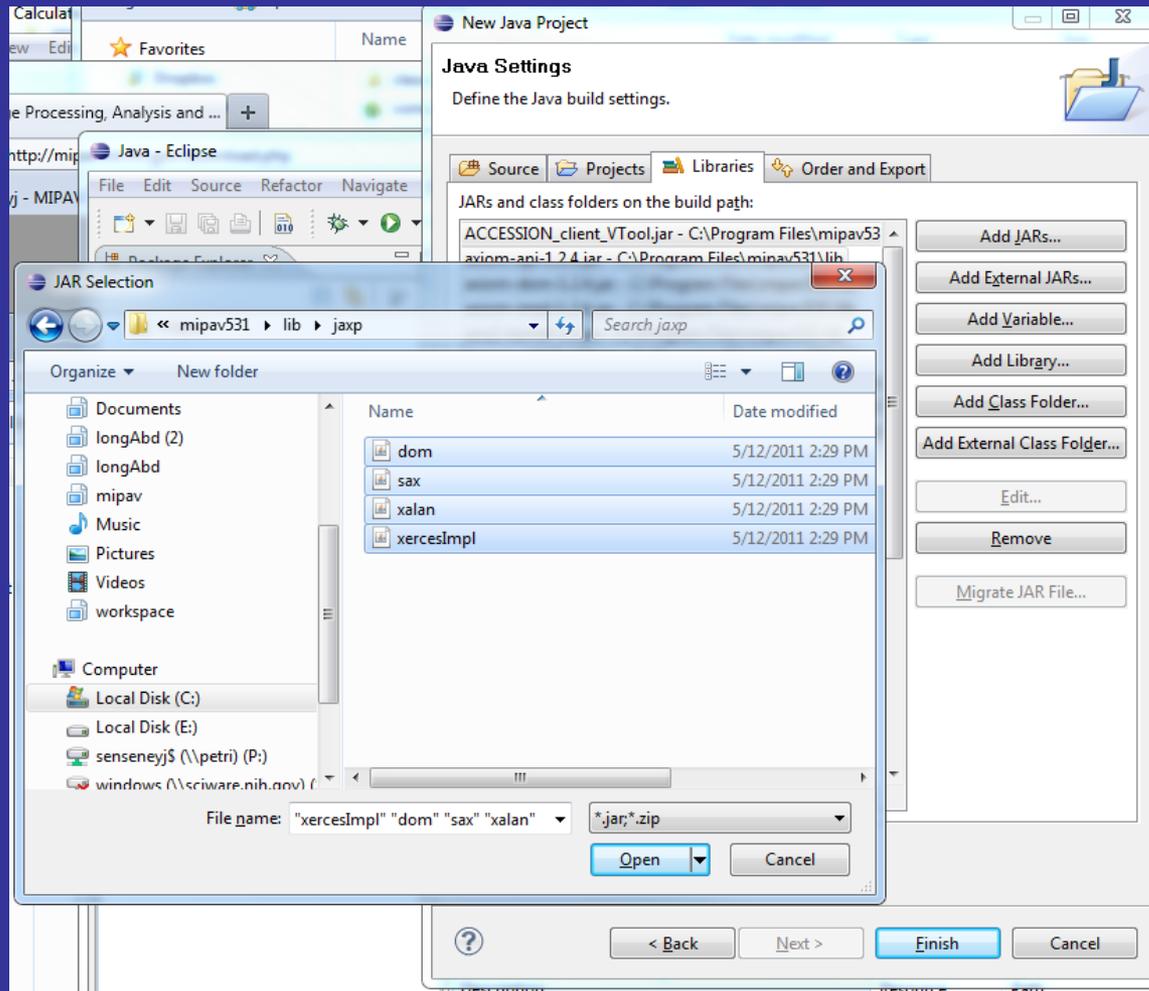
- Libraries
 - PDFbox
 - JPEG2000
 - ImageJ
- Help files
- Insight Toolkit wrappers



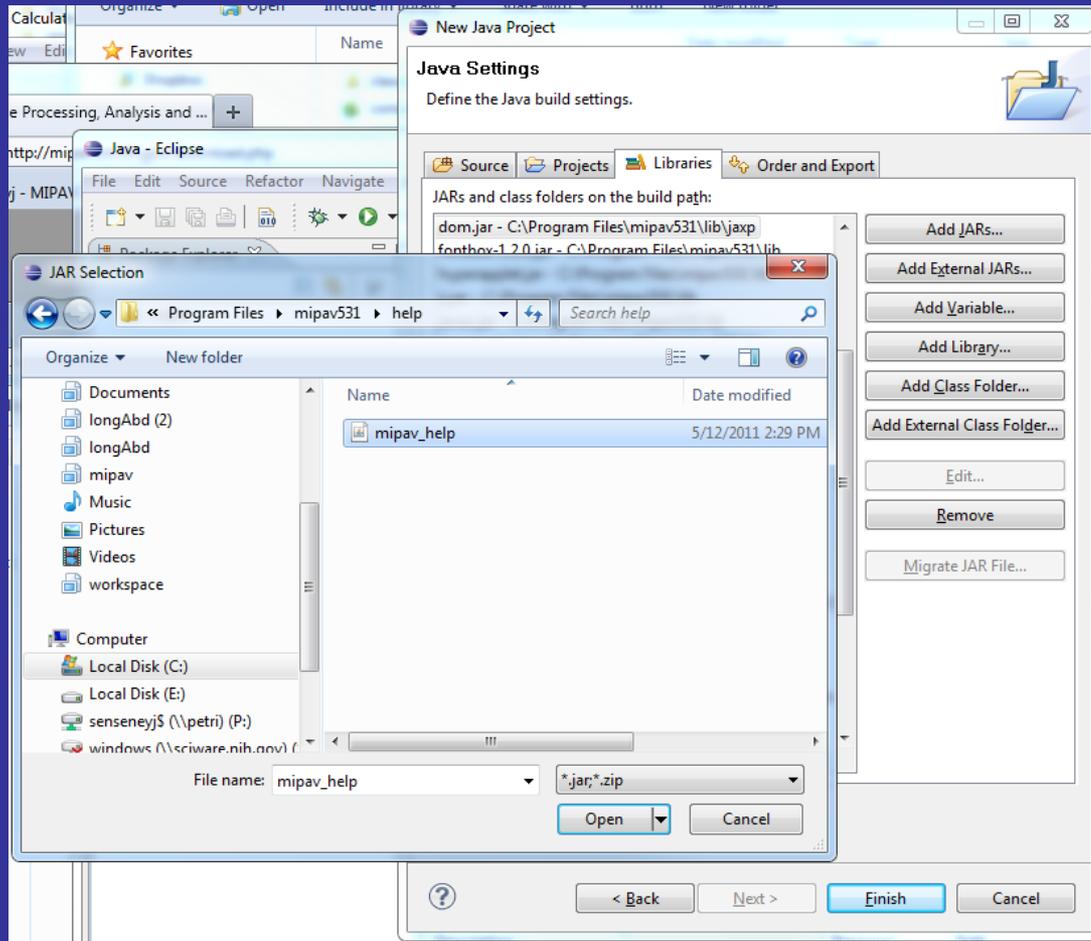
Add Jars



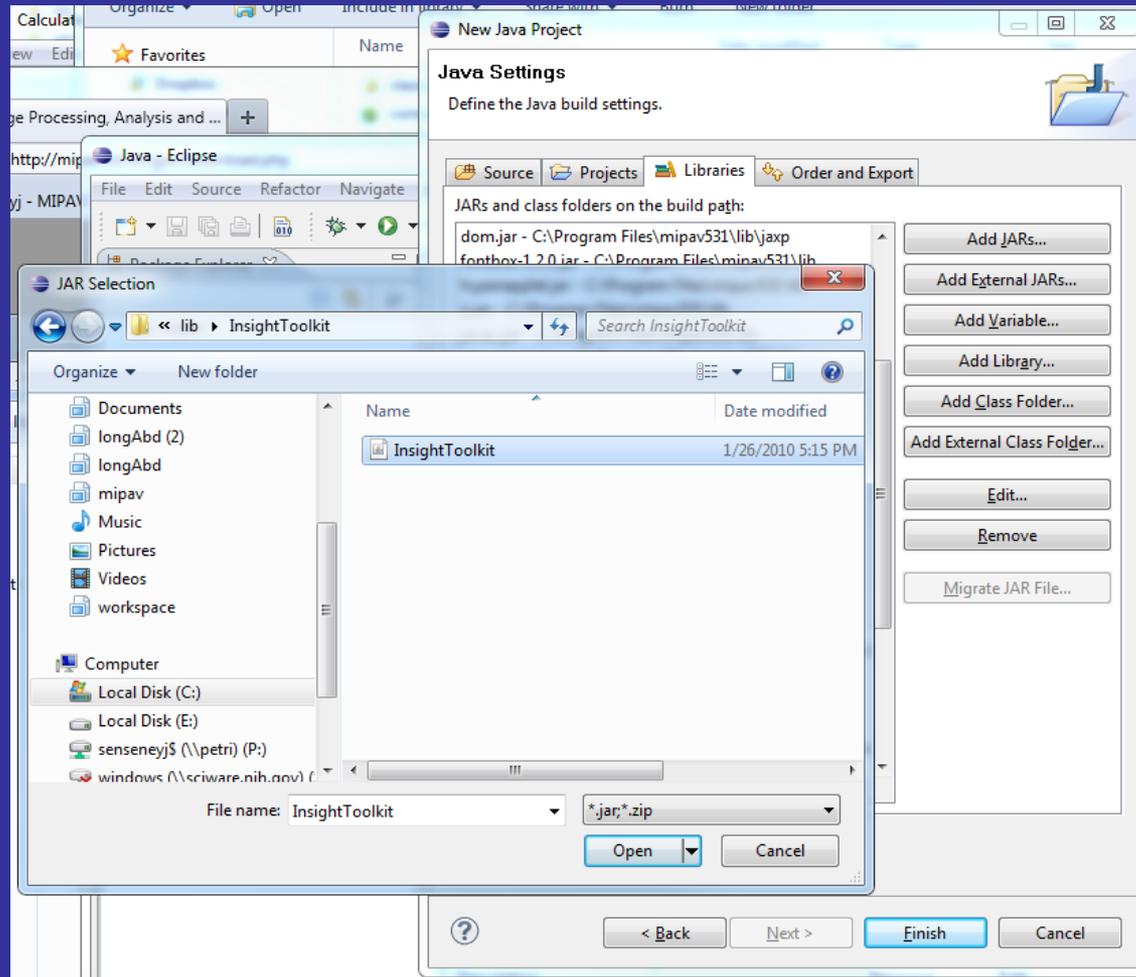
More Jars



More Jars: Help



More Jars: ITK

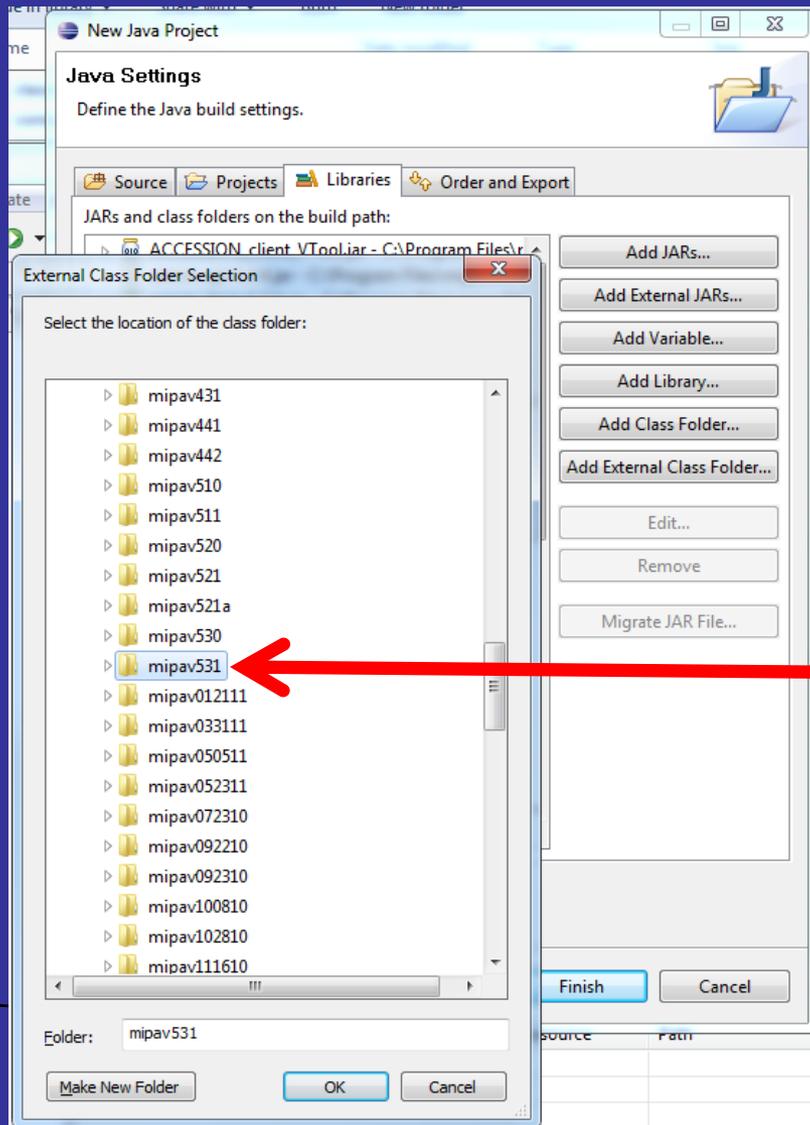


Class files

- Object-oriented
- Executable programs
- In Mipav:
 - Read/write images
 - Apply filters
 - Run plugins!



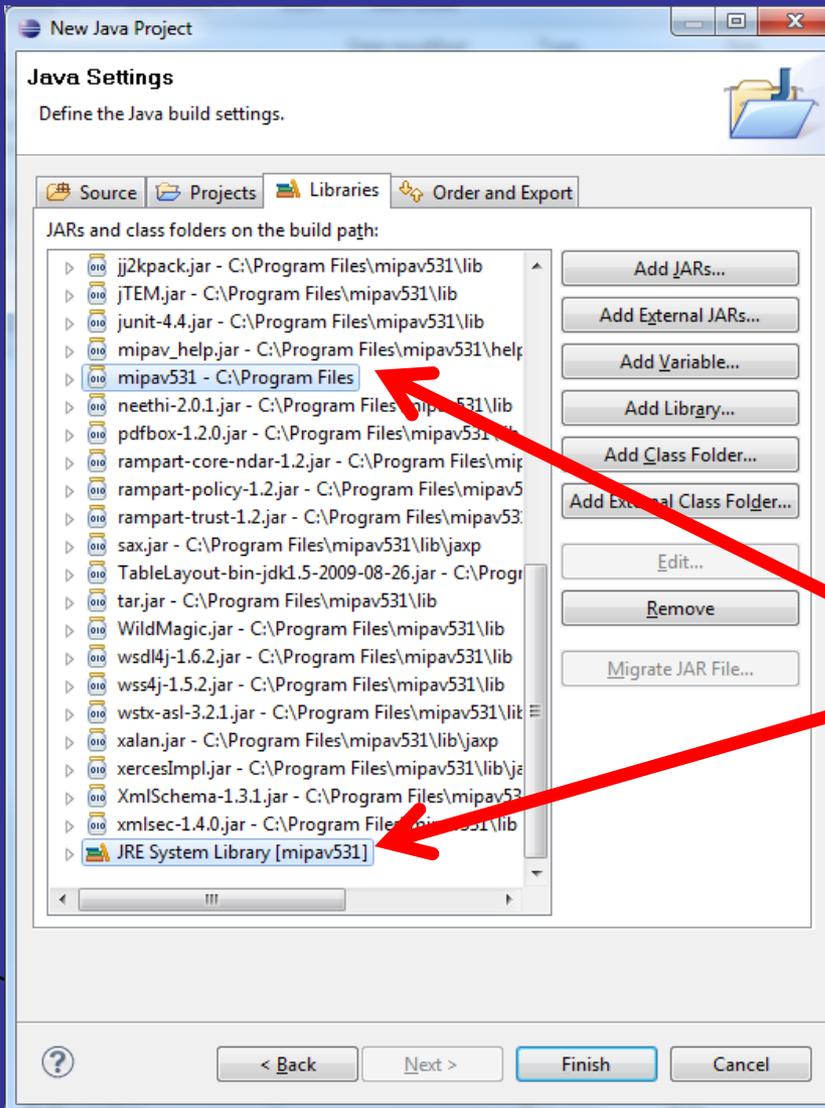
External class folder



Select the correct version of Mipav



Click Finish!



*Note class folder
and JRE selection*

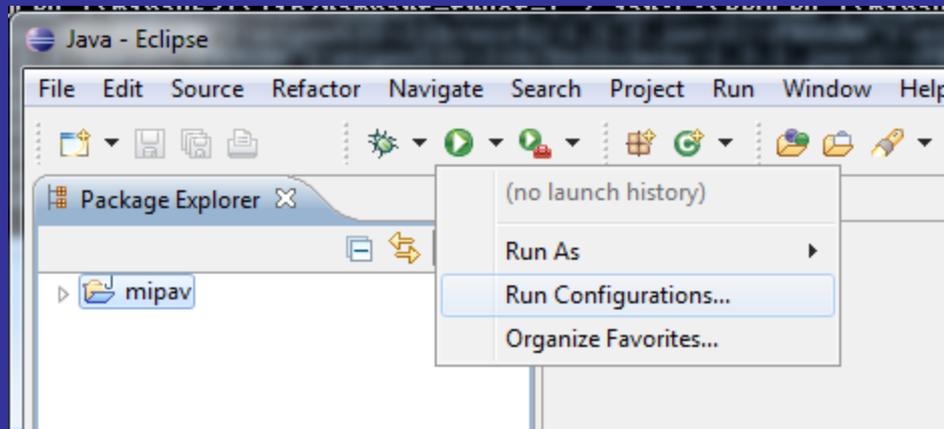


MipavMain

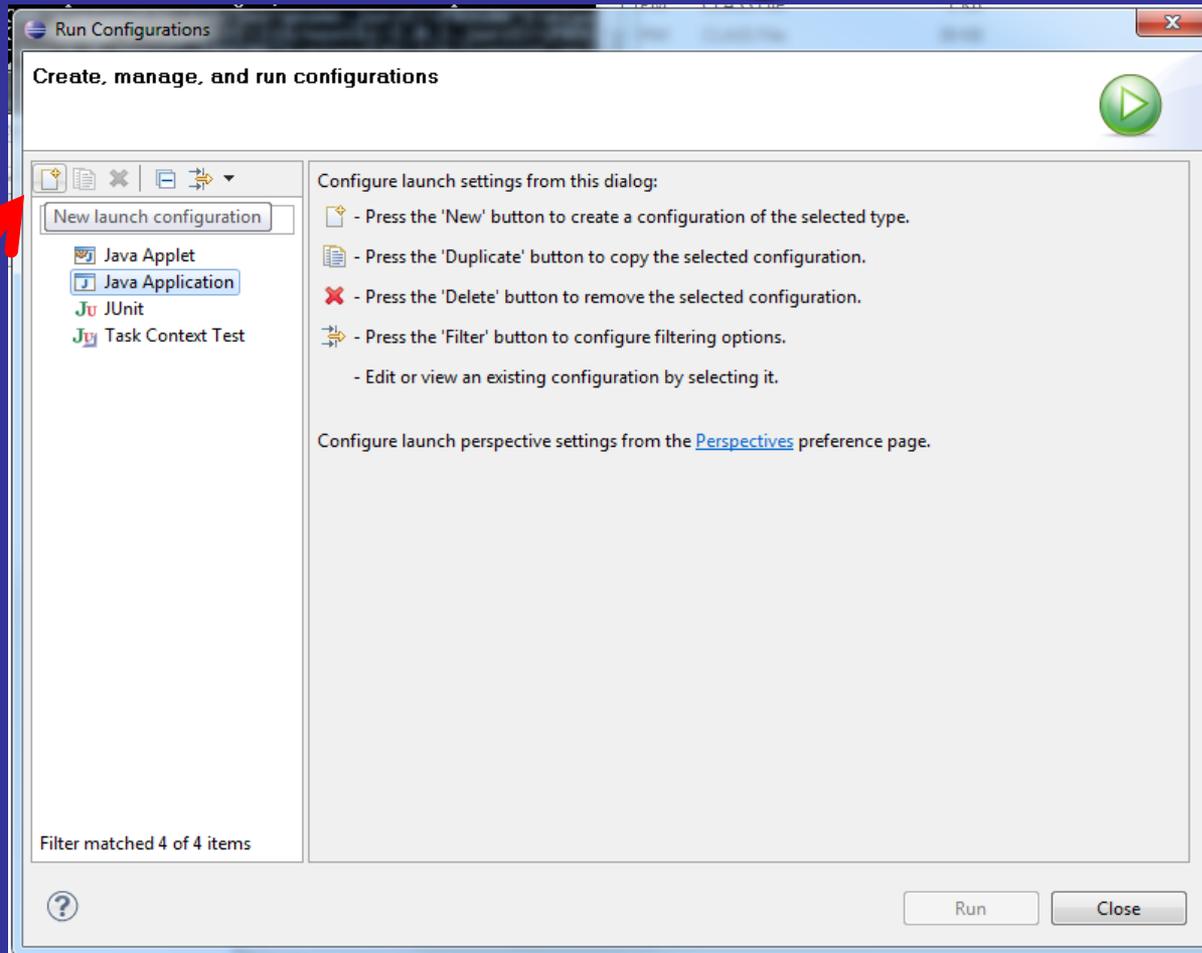
```
cmd Select C:\Windows\system32\cmd.exe
CMD LINE: "C:\PROGRA~1\mipav543\jre\bin\java.exe" -server -classpath "C:\PROGRA~1\mipav543\.;C:\PROGRA~1\mipav543\help\mipav_help.jar;C:\PROGRA~1\mipav543\InsightToolkit\lib\InsightToolkit\InsightToolkit.jar;C:\PROGRA~1\mipav543\lib\JimiProClasses.jar;C:\PROGRA~1\mipav543\lib\jaxp\dom.jar;C:\PROGRA~1\mipav543\lib\jaxp\sax.jar;C:\PROGRA~1\mipav543\lib\jaxp\dom.jar;C:\PROGRA~1\mipav543\lib\jaxp\jaxp-impl.jar;C:\PROGRA~1\mipav543\lib\tar.jar;C:\PROGRA~1\mipav543\lib\jdom.jar;C:\PROGRA~1\mipav543\lib\junit-4.4.jar;C:\PROGRA~1\mipav543\lib\WildMagic.jar;C:\PROGRA~1\mipav543\lib\jj2kpack.jar;C:\PROGRA~1\mipav543\lib\jhall.jar;C:\PROGRA~1\mipav543\lib\ACCESSION_client_VTool.jar;C:\PROGRA~1\mipav543\lib\axiom-api-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axiom-dom-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axiom-impl-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axis2-kernel-1.2.jar;C:\PROGRA~1\mipav543\lib\bcprov-jdk15-136.jar;C:\PROGRA~1\mipav543\lib\commons-codec-1.3.jar;C:\PROGRA~1\mipav543\lib\commons-httpclient-3.0.1.jar;C:\PROGRA~1\mipav543\lib\commons-logging-1.1.1.jar;C:\PROGRA~1\mipav543\lib\jax-gname.jar;C:\PROGRA~1\mipav543\lib\jaxen-1.1-beta-10.jar;C:\PROGRA~1\mipav543\lib\neethi-2.0.1.jar;C:\PROGRA~1\mipav543\lib\rampart-core-ndar-1.2.jar;C:\PROGRA~1\mipav543\lib\rampart-policy-1.2.jar;C:\PROGRA~1\mipav543\lib\rampart-trust-1.2.jar;C:\PROGRA~1\mipav543\lib\wsdl4j-1.6.2.jar;C:\PROGRA~1\mipav543\lib\wss4j-1.5.2.jar;C:\PROGRA~1\mipav543\lib\wstx-asl-3.2.1.jar;C:\PROGRA~1\mipav543\lib\XmlSchema-1.3.1.jar;C:\PROGRA~1\mipav543\lib\xmlsec-1.4.0.jar;C:\PROGRA~1\mipav543\lib\pdfbox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\jemphox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\fontbox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\jTEM.jar;C:\PROGRA~1\mipav543\lib\TableLayout-bin-jdk1.5-2009-08-26.jar;C:\PROGRA~1\mipav543\lib\hyperapplet.jar;C:\PROGRA~1\mipav543\lib\javac.jar;C:\PROGRA~1\mipav543\lib\ij.jar;C:\PROGRA~1\mipav543\lib\core_dictionary-4.1.1.8.jar;C:\PROGRA~1\mipav543\lib\dataDictionaryClient-4.1.1.8.jar;C:\PROGRA~1\mipav543\lib\lax.jar;C:\Users\sensenyj\mipav\plugins;C:\Users\sensenyj\mipav\plugins\plugins.jar" -Xms2936012800 -Xmx2936012800 MipavMain
```



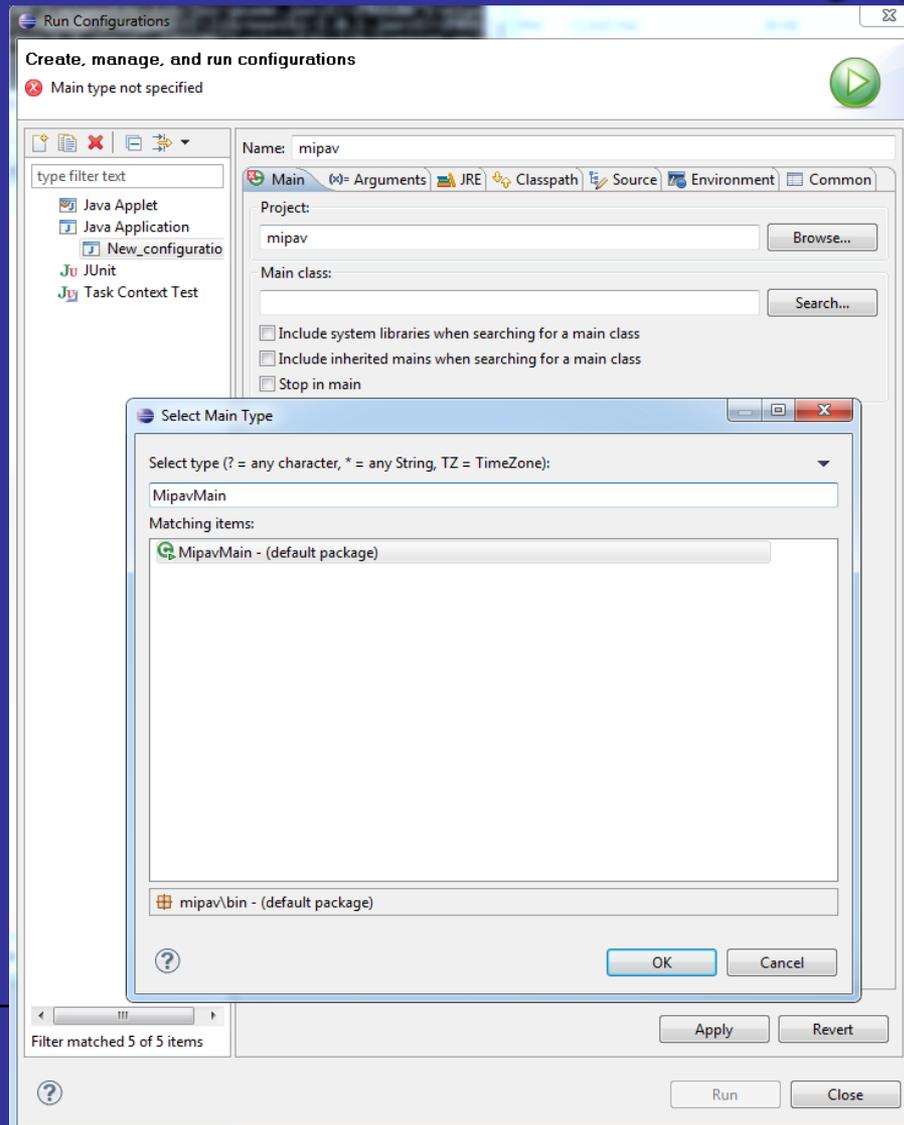
Run Configuration



New Configuration



Select Main Type



Java Memory

-Xms (min), -Xmx (max)

```
cmd Select C:\Windows\system32\cmd.exe
CMD LINE: "C:\PROGRA~1\mipav543\jre\bin\java.exe" -server -classpath "C:\PROGRA~1\mipav543\.;C:\PROGRA~1\mipav543\help\mipav_help.jar;C:\PROGRA~1\mipav543\InsightToolkit\lib\InsightToolkit\InsightToolkit.jar;C:\PROGRA~1\mipav543\lib\JimiProClasses.jar;C:\PROGRA~1\mipav543\lib\jaxp\dom.jar;C:\PROGRA~1\mipav543\lib\jaxp\sax.jar;C:\PROGRA~1\mipav543\lib\jaxp\dom.jar;C:\PROGRA~1\mipav543\lib\jaxp\jaxp-impl.jar;C:\PROGRA~1\mipav543\lib\tar.jar;C:\PROGRA~1\mipav543\lib\jdom.jar;C:\PROGRA~1\mipav543\lib\junit-4.4.jar;C:\PROGRA~1\mipav543\lib\WildMagic.jar;C:\PROGRA~1\mipav543\lib\jj2kpack.jar;C:\PROGRA~1\mipav543\lib\jhall.jar;C:\PROGRA~1\mipav543\lib\ACCESSION_client_VTool.jar;C:\PROGRA~1\mipav543\lib\axiom-api-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axiom-dom-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axiom-impl-1.2.4.jar;C:\PROGRA~1\mipav543\lib\axis2-kernel-1.2.jar;C:\PROGRA~1\mipav543\lib\bcprov-jdk15-136.jar;C:\PROGRA~1\mipav543\lib\commons-codec-1.3.jar;C:\PROGRA~1\mipav543\lib\commons-httpclient-3.0.1.jar;C:\PROGRA~1\mipav543\lib\commons-logging-1.1.1.jar;C:\PROGRA~1\mipav543\lib\jax-gnome.jar;C:\PROGRA~1\mipav543\lib\jaxen-1.1-beta-10.jar;C:\PROGRA~1\mipav543\lib\neethi-2.0.1.jar;C:\PROGRA~1\mipav543\lib\rampart-core-ndar-1.2.jar;C:\PROGRA~1\mipav543\lib\rampart-policy-1.2.jar;C:\PROGRA~1\mipav543\lib\rampart-trust-1.2.jar;C:\PROGRA~1\mipav543\lib\wsdl4j-1.6.2.jar;C:\PROGRA~1\mipav543\lib\wss4j-1.5.2.jar;C:\PROGRA~1\mipav543\lib\wstx-asl-3.2.1.jar;C:\PROGRA~1\mipav543\lib\XmlSchema-1.3.1.jar;C:\PROGRA~1\mipav543\lib\xmlsec-1.4.0.jar;C:\PROGRA~1\mipav543\lib\pdfbox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\jemphox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\fontbox-1.2.0.jar;C:\PROGRA~1\mipav543\lib\jTEM.jar;C:\PROGRA~1\mipav543\lib\TableLayout-bin-jdk1.5-2009-08-26.jar;C:\PROGRA~1\mipav543\lib\hyperapplet.jar;C:\PROGRA~1\mipav543\lib\javac.jar;C:\PROGRA~1\mipav543\lib\ij.jar;C:\PROGRA~1\mipav543\lib\core_dictionary-4.1.1.8.jar;C:\PROGRA~1\mipav543\lib\dataDictionaryClient-4.1.1.8.jar;C:\PROGRA~1\mipav543\lax.jar;C:\Users\sensenevj\mipav\plugins;C:\Users\sensenevj\mipav\plugins\plugins.jar" -Xms2936012800 -Xmx2936012800 MipavMain
```



Memory

Run Configurations

Create, manage, and run configurations

Run a Java application

Name: mipav

Program arguments:

VM arguments:
-Xms5120m -Xmx5120m

Working directory:
 Default: \${workspace_loc:mipav}

Apply Revert

Run Close

Filter matched 5 of 5 items



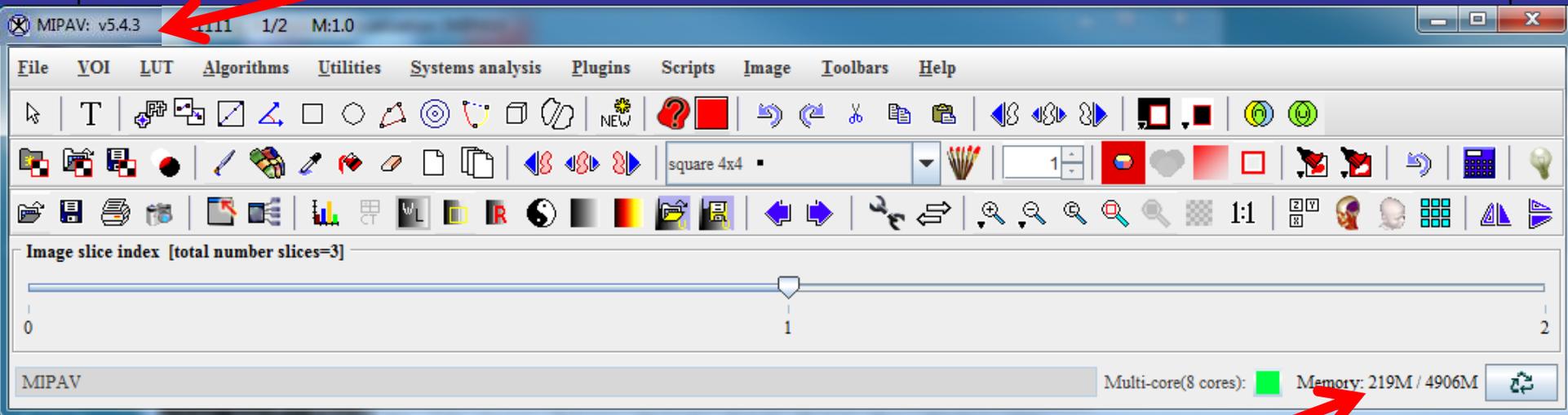
Run Mipav

- MipavMain is executed
 - Classpath is set
 - Memory allocated
 - Libraries are referenced



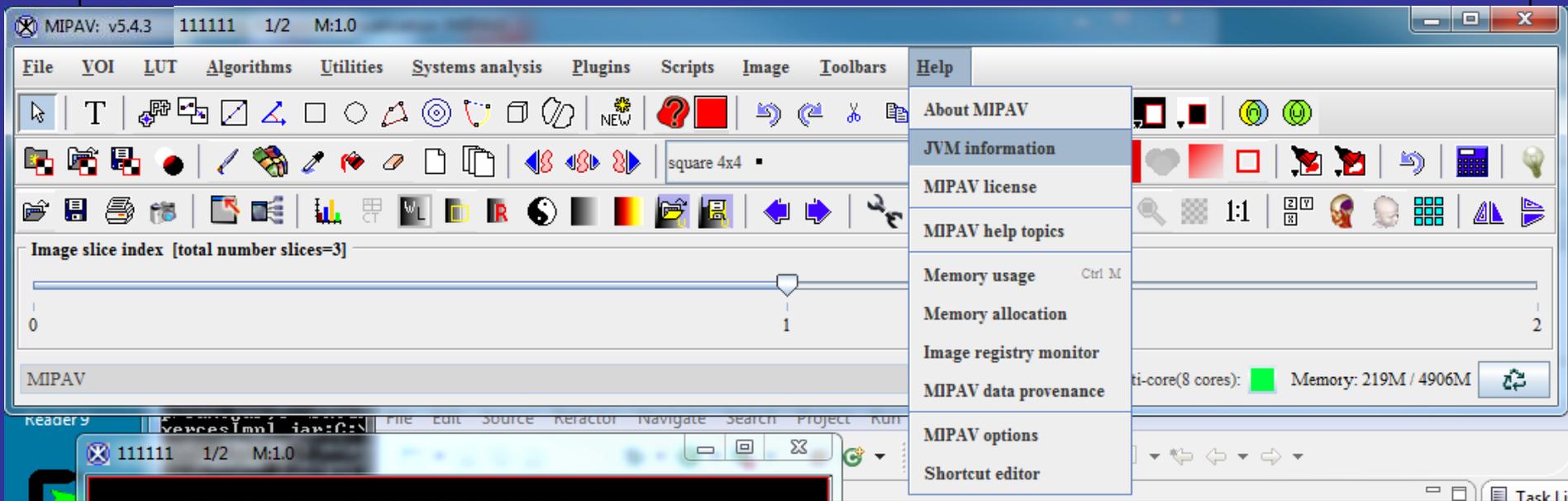
Mipav Launched

Version number



VM Memory

View JVM Info



JVM Info

```
Java version:      1.6.0_24
Java compiler:    null
Java vendor:      Sun Microsystems Inc.
Java vendor.url:  http://java.sun.com/
Java home:        C:\Program Files\mipav531\jre
Java class version: 50.0
Java class path:
C:\Users\sensenej\workspace\mipav\bin
C:\Program Files\mipav531\lib\ACCESSION_client_VTool.jar
C:\Program Files\mipav531\lib\axiom-api-1.2.4.jar
C:\Program Files\mipav531\lib\axiom-dom-1.2.4.jar
C:\Program Files\mipav531\lib\axiom-impl-1.2.4.jar
C:\Program Files\mipav531\lib\axis2-kernel-1.2.jar
C:\Program Files\mipav531\lib\bcprov-jdk15-136.jar
C:\Program Files\mipav531\lib\commons-codec-1.3.jar
C:\Program Files\mipav531\lib\commons-httpclient-3.0.1.jar
C:\Program Files\mipav531\lib\commons-logging-1.1.1.jar
```

JRE in mipav

Plugin folder in workspace

Java Compiler

- Source code:
 - *.java files
 - Text-editor readable
- Platform independent byte-code:
 - *.class files





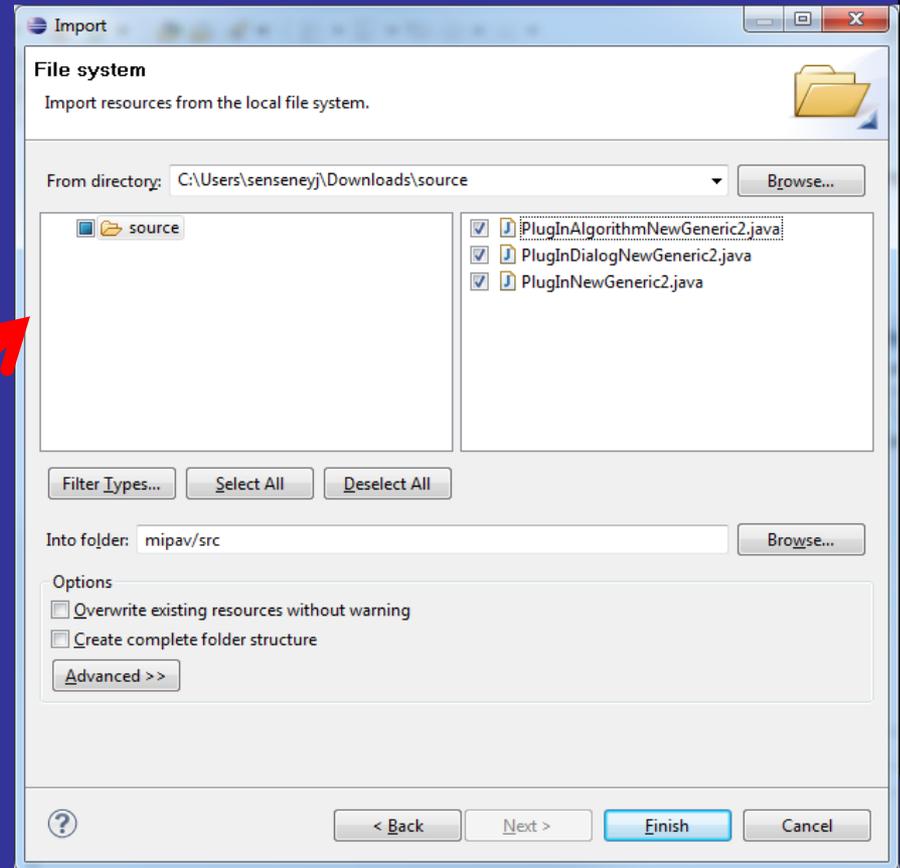
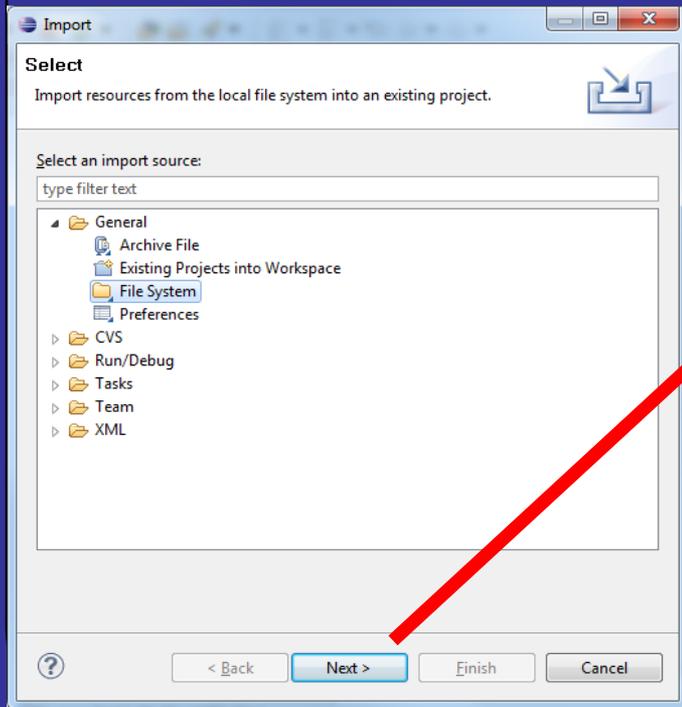
Get NewGeneric542

- Download three files from <http://dcb.cit.nih.gov/~sensenej/code/plugin.html>
 - PlugInNewGeneric542.java
 - PlugInDialogNewGeneric542.java
 - PlugInAlgorithmNewGeneric542.java



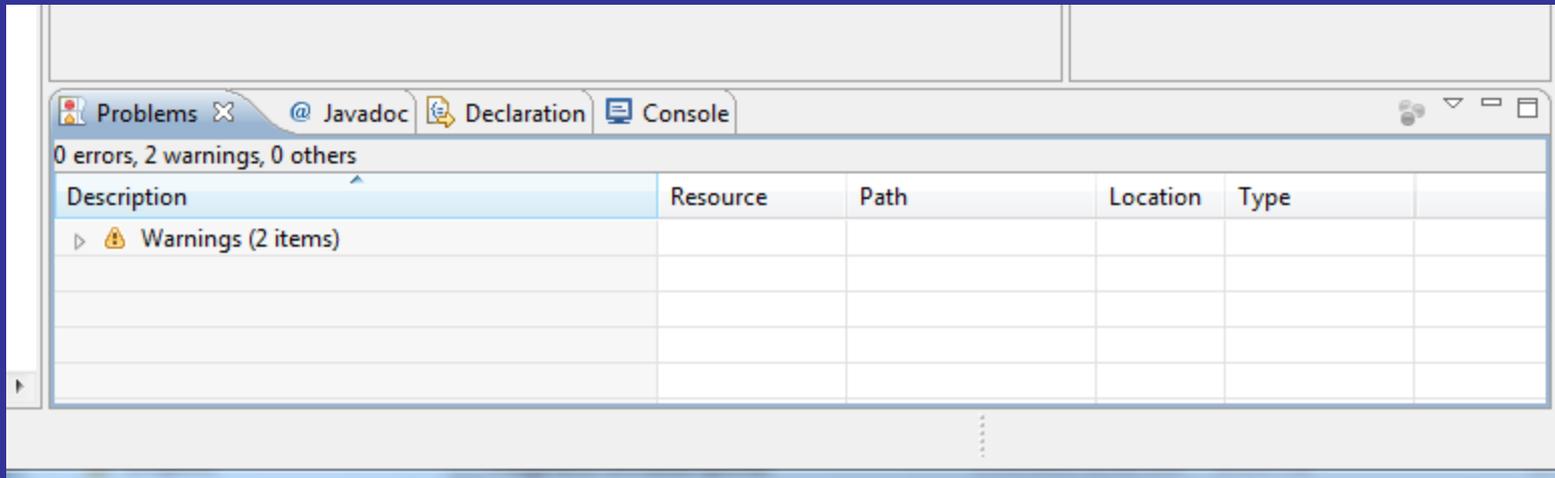
Import NewGeneric542

- In Eclipse: Press File->Import



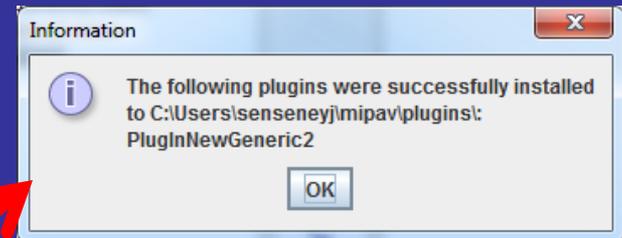
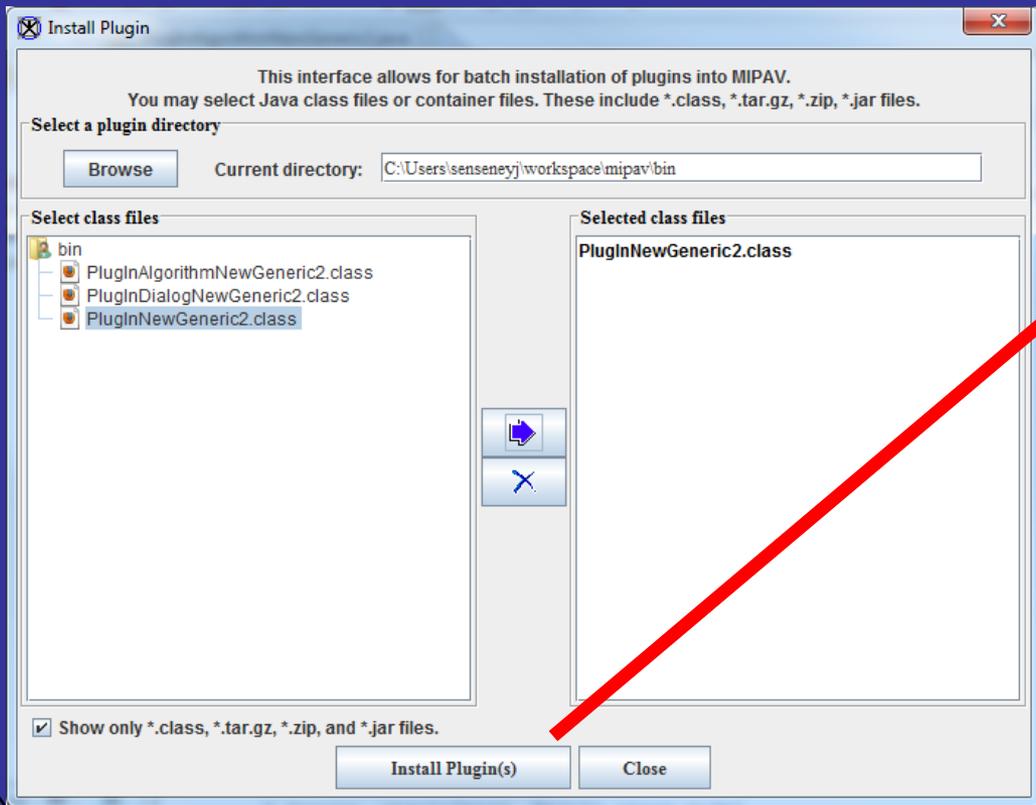
Compile NewGeneric542

- This is done for you, incrementally in Eclipse
 - Errors and warnings update with each change



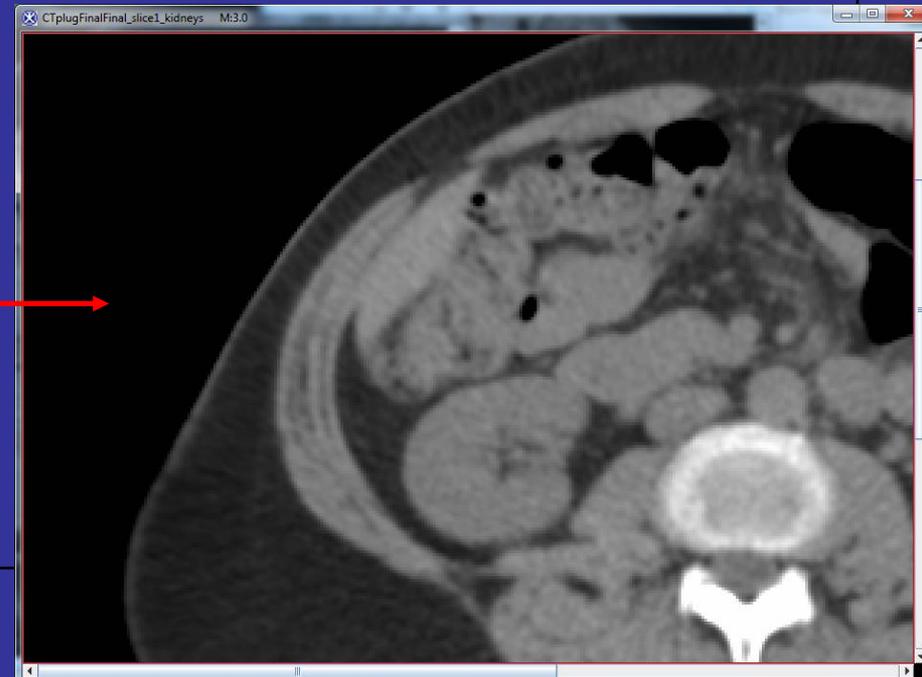
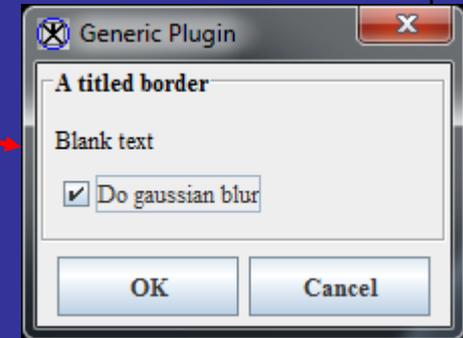
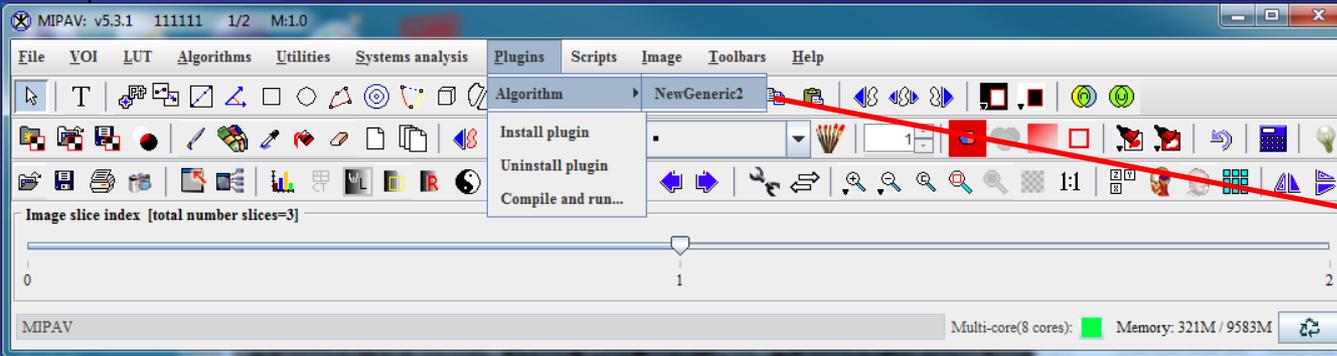
Install NewGeneric542

- Only install PlugInNewGeneric542.class



Why did this work?

Run NewGeneric542



Plugins - Documentation

- Plugin development documentation

http://mipav.cit.nih.gov/documentation/userguide/volume1/MIPAV_PlugIns.pdf

- This presentation is posted at:

- <http://dcb.cit.nih.gov/~sensenej/code/plugin.html>

- Will also be posted here:

- <http://mipav.cit.nih.gov/documentation/presentations/>

- Also see this wiki page:

- http://mipav.cit.nih.gov/pubwiki/index.php/Writing_MIPAV_plugins_without_MIPAV_source_code#Requirements



Plugins, Part 2

M I P A V

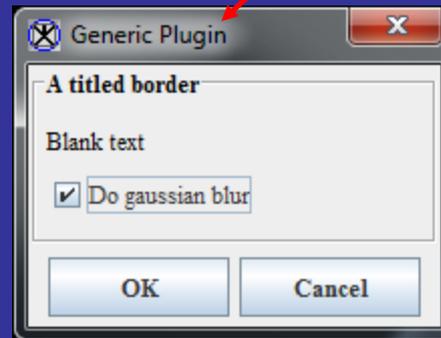
Medical Image Processing, Analysis, & Visualization

<http://mipav.cit.nih.gov>



Look at NewGeneric542

- Open Dialog, try to change the title “Generic Plugin”



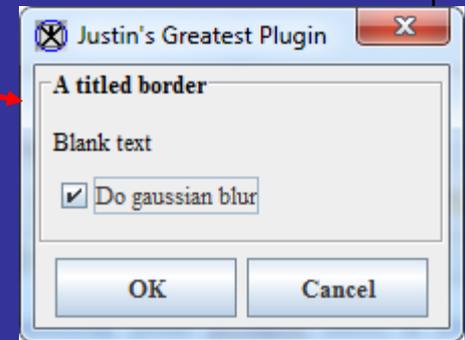
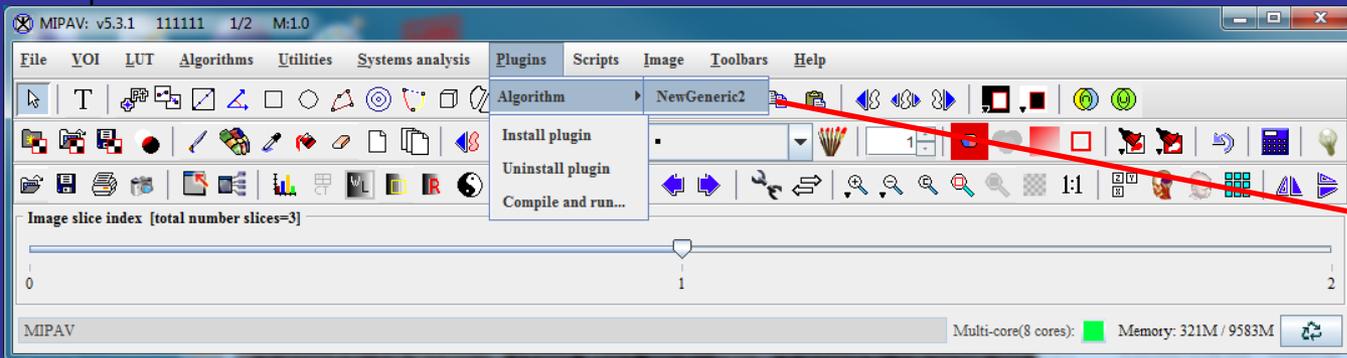
Change NewGeneric542

- Location:

The screenshot shows the Eclipse IDE interface. The main editor displays the source code for `PlugInDialogNewGeneric2.java`. The code includes a comment: `/** * Used in turning your plugin into a script */`. The `storeParamsFromGUI` method is defined as `protected void storeParamsFromGUI() throws ParserException { scriptParameters.storeInputImage(image); scriptParameters.getParams().put(ParameterFact... } //end storeParamsFromGUI()`. The `init` method is defined as `private void init() { setForeground(Color.black); setTitle("Justin's Greatest Plugin"); try { setIconImage(MipavUtil.getIconImage("divin...)`. The Package Explorer on the left shows the project structure: `mipav` (src) (default package) `PlugInAlgorithmNewGener...` `PlugInDialogNewGeneric2.j` `PlugInNewGeneric2.java` `JRE System Library [mipav531]` `Referenced Libraries`. The Outline view on the right shows the class structure. The Console view at the bottom shows the following output: `mipav [Java Application] C:\Program Files\mipav531\jre\bin\javaw.exe (May 25, 2011 12:40:46 PM)` `DEBUG: Starting options file cannot be found. Check path and filename.` `Starting options file cannot be found. Check path and filename.` `Hi`. The status bar at the bottom indicates `Writable`, `Smart Insert`, and `232 : 36`.

Run NewGeneric542

- See change:



NewGeneric Algorithm

- Look at algorithm construction, execution

The screenshot shows the Eclipse IDE interface. The main editor displays the following Java code:

```
97     fireProgressStateChanged("Message 2D: "+srcImage.getImageName());
98
99     if(doGaussian) {
100         final float[] sigmas = {1.0f, 1.0f};
101
102         AlgorithmGaussianBlur gaussianBlurAlgo = new AlgorithmGaussianBlur(destImage, srcImage,
103             gaussianBlurAlgo.setRunningInSeparateThread(false);
104         linkProgressToAlgorithm(gaussianBlurAlgo);
105         gaussianBlurAlgo.runAlgorithm();
106     }
107
108     for(int i=1; i<100; i++) {
109         fireProgressStateChanged(i);
110     }
```

The console window at the bottom shows the following output:

```
<terminated> mipav [Java Application] C:\Program Files\mipav531\jre\bin\javaw.exe (May 25, 2011 12:46:12 PM)
DEBUG: GetPath.getPath: Could not find mipav.app\Contents\Info.plist.  Checked C:\Users\senseneyj\works
DEBUG: Starting options file cannot be found.  Check path and filename.
Starting options file cannot be found.  Check path and filename.
```

The status bar at the bottom indicates "Writable", "Smart Insert", and "30 : 49".

MIPAV Documentation

- CTRL-click on run algorithm, now try hovering:

The screenshot shows the Eclipse IDE interface. The top window is titled "Java - gov.nih.mipav.model.algorithms.AlgorithmBase - Eclipse". The menu bar includes File, Edit, Source, Refactor, Navigate, Search, Project, Run, Window, and Help. The toolbar contains various icons for file operations and development tools. The left sidebar shows a project tree with "mipav" and "src" folders. The main editor area is titled "Class File Editor" and displays the following text:

Source not found

The JAR file C:\Program Files\mipav531 has no source attachment.
You can attach the source by clicking Attach Source below:

// Compiled from AlgorithmBase.java (version 1.6 : 50.0, super bit)
public abstract class gov.nih.mipav.model.algorithms.AlgorithmBase extends java.lang.Thread implements java.awt.event.ActionListener, java.awt.event.Wi

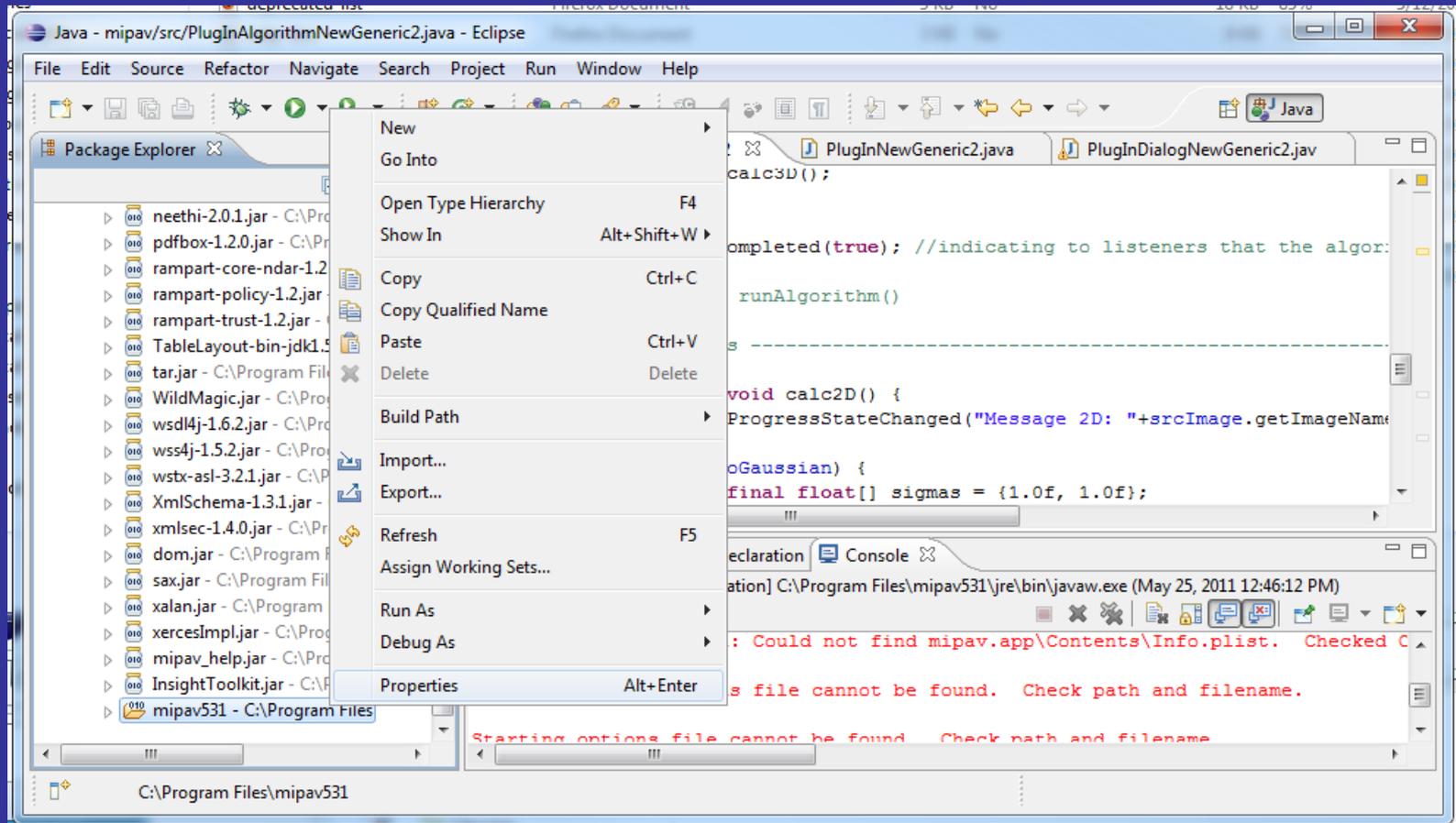
The bottom window is titled "Problems @ Javadoc Declaration Console" and shows the following output:

```
<terminated> mipav [Java Application] C:\Program Files\mipav531\jre\bin\javaw.exe (May 25, 2011 12:46:12 PM)
DEBUG: GetPath.getPath: Could not find mipav.app\Contents\Info.plist. Checked C:\Users\sensenej\works
DEBUG: Starting options file cannot be found. Check path and filename.
Starting options file cannot be found. Check path and filename.
```

The status bar at the bottom indicates "Read-Only", "Smart Insert", and "1 : 1".

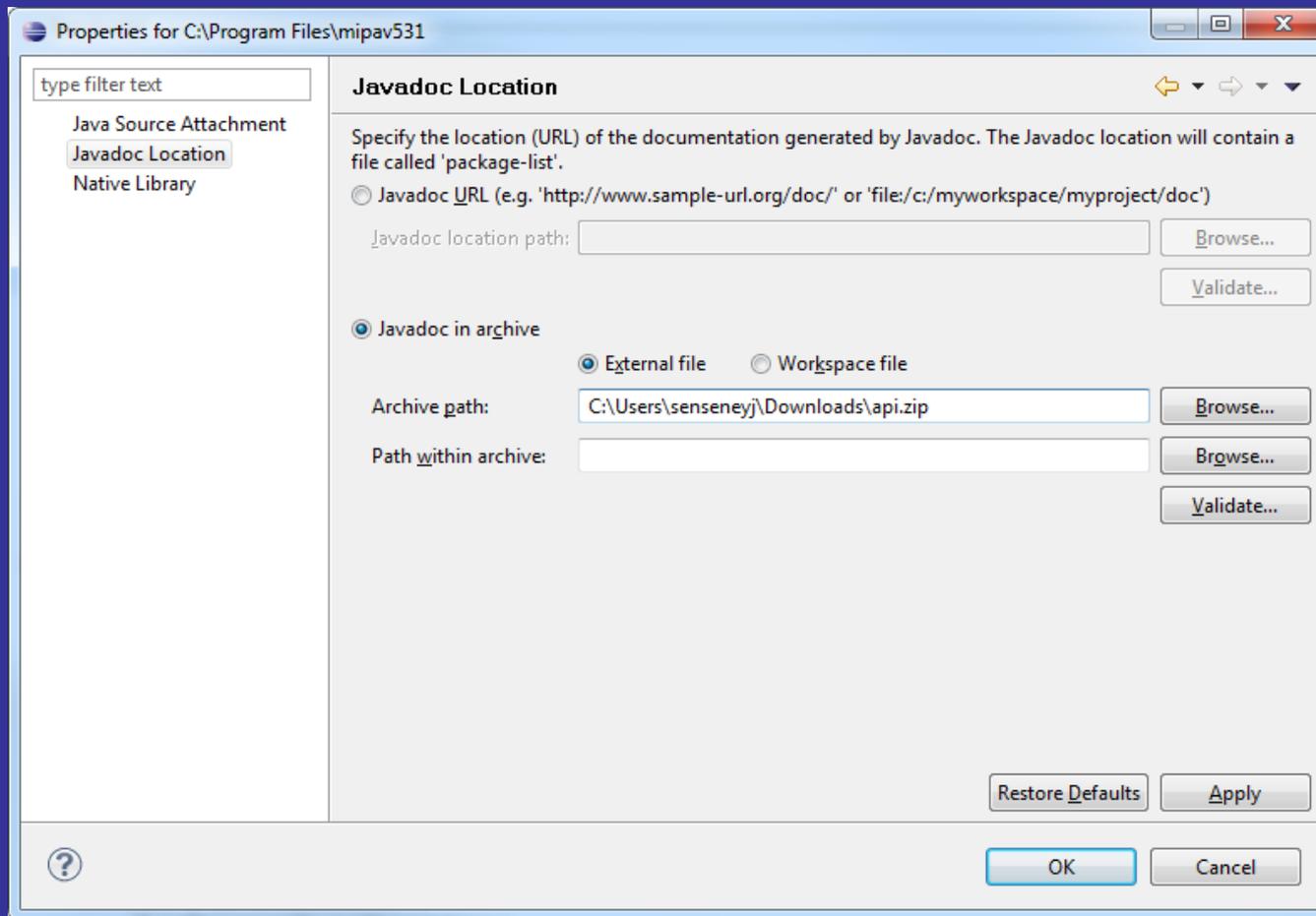
Plugins - MIPAV API

Download from: <http://mipav.cit.nih.gov/documentation/api.zip>



Plugins - MIPAV API

Attach here:



Plugins - MIPAV API

View here:

The screenshot shows a Firefox browser window with the following details:

- Browser:** Firefox
- Address Bar:** http://mipav.cit.nih.gov/documentation/api/index.html
- Page Title:** Overview (MIPAV API Documentation)
- Navigation:** Overview | Package | Class | Tree | Deprecated | Index | Help
- Left Panel:**
 - All Classes
 - Packages
 - gov.nih.mipav.model
 - gov.nih.mipav.model.algorithms
 - gov.nih.mipav.model.algorithms.D
 - gov.nih.mipav.model.algorithms.fil
 - gov.nih.mipav.model.algorithms.fil
 - gov.nih.mipav.model.algorithms.itk
 - All Classes
 - ActionBase
 - ActionChangeEndianness
 - ActionChangeModality
 - ActionChangeName
 - ActionChangeOrientations
 - ActionChangeOrigin
 - ActionChangeResolutions
 - ActionChangeTalairachInfo
 - ActionChangeTransformInfo
 - ActionChangeUnits
 - ActionClone
 - ActionCloseFrame
 - ActionCollectGarbage
 - ActionCreateBlankImage
 - ActionDiscovery
 - ActionExit
 - ActionExtractImageB
 - ActionImageProcessorBase
 - ActionMaskToPaint
 - ActionMaskToVOI
 - ActionMetadata
 - ActionMetadata.ImageRequireme
 - ActionOpenAllVOIs
- Main Content Area:**

Packages

gov.nih.mipav.model	
gov.nih.mipav.model.algorithms	
gov.nih.mipav.model.algorithms.DiffusionTensorImaging	
gov.nih.mipav.model.algorithms.filters	
gov.nih.mipav.model.algorithms.filters.OpenCL.filters	
gov.nih.mipav.model.algorithms.itk	
gov.nih.mipav.model.algorithms.levelset	
gov.nih.mipav.model.algorithms.registration	
gov.nih.mipav.model.algorithms.utilities	
gov.nih.mipav.model.dicomcomm	
gov.nih.mipav.model.file	
gov.nih.mipav.model.file.rawjp2	
gov.nih.mipav.model.provenance	
gov.nih.mipav.model.provenance.actions	
gov.nih.mipav.model.scripting	
gov.nih.mipav.model.scripting.actions	
gov.nih.mipav.model.scripting.parameters	
gov.nih.mipav.model.structures	
gov.nih.mipav.model.structures.event	This package carries the different events and listeners arranged around the structure Objects within MIPAV.
gov.nih.mipav.model.structures.ima	



ModelImage

- Data stored in 1D array.
- Color, complex images use multiple indices per pixel.
- Export()/Import()



ViewJFrameImage

- Contains ModelImage
- Example of frame enclosing GUI components
- Refreshed to reflect changes





JDialogBase

- GUI component for collecting user/image input
- Extends java awt/swing packages
- Listens for algorithm completion
- Point of entry/exit for algorithms





AlgorithmBase

- Performs image processing
- Constructor, get/set use
- Standard processing components for extension



Modify Plugin Lab

- Edit PlugInNewGeneric542:

- 10pt* • Change text in plugin dialog.
- 10pt* • Print out when algorithm has completed.
- 10pt* • Increase kernel size.
- 20pt* • Change 3D to 2.5D processing.
- 20pt* • Add check box to allow user to select either 3D or 2.5D processing.
- 30pt* • Pre-process image by thresholding all pixels below a given intensity value.



Plugins - Documentation

- Plugin development documentation

http://mipav.cit.nih.gov/documentation/userguide/volume1/MIPAV_PlugIns.pdf

- This presentation is posted at:

- <http://dcb.cit.nih.gov/~sensenej/code/plugin.html>

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- Also see this wiki page:

- http://mipav.cit.nih.gov/pubwiki/index.php/Writing_MIPAV_plugins_without_MIPAV_source_code#Requirements

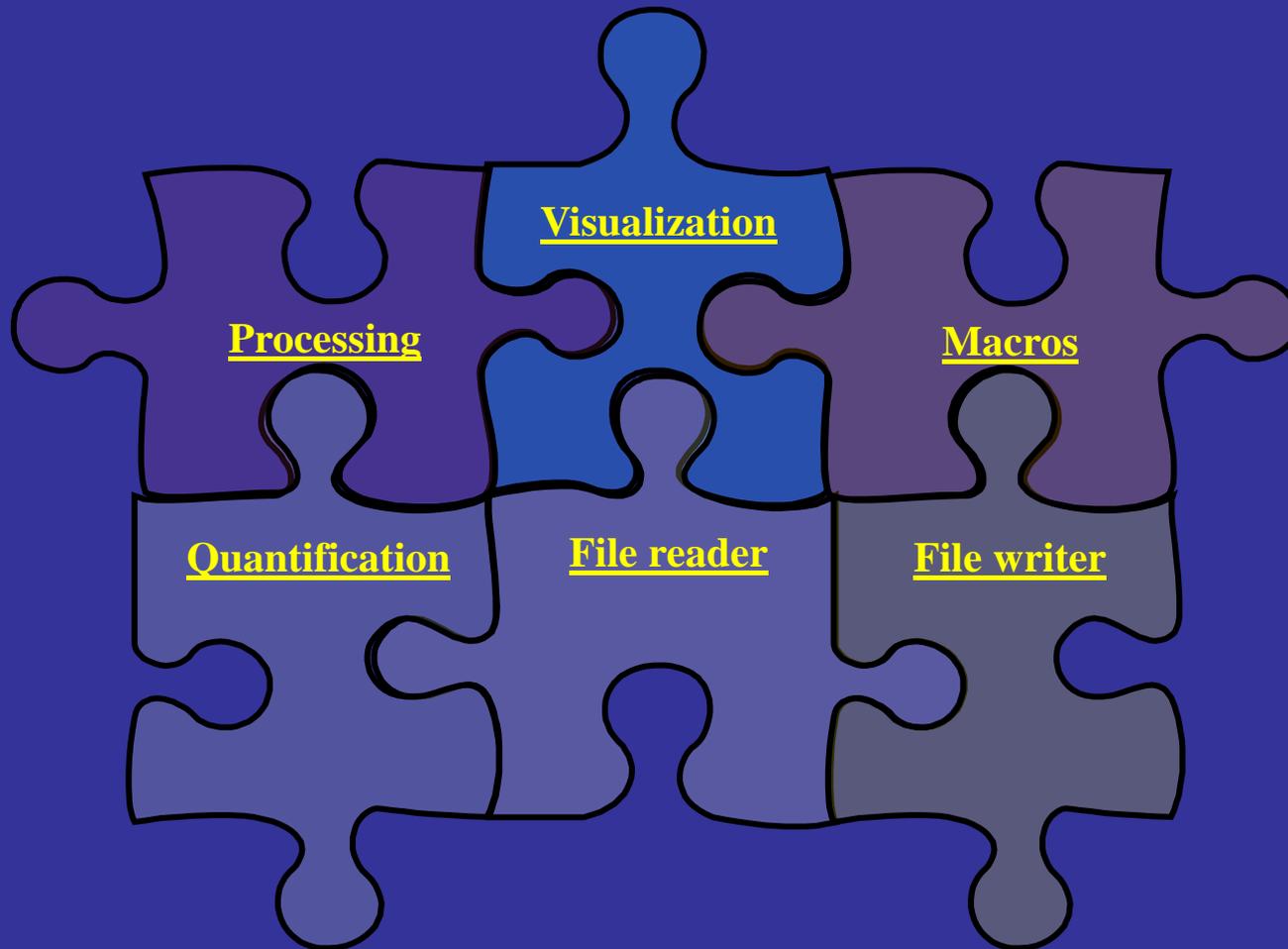




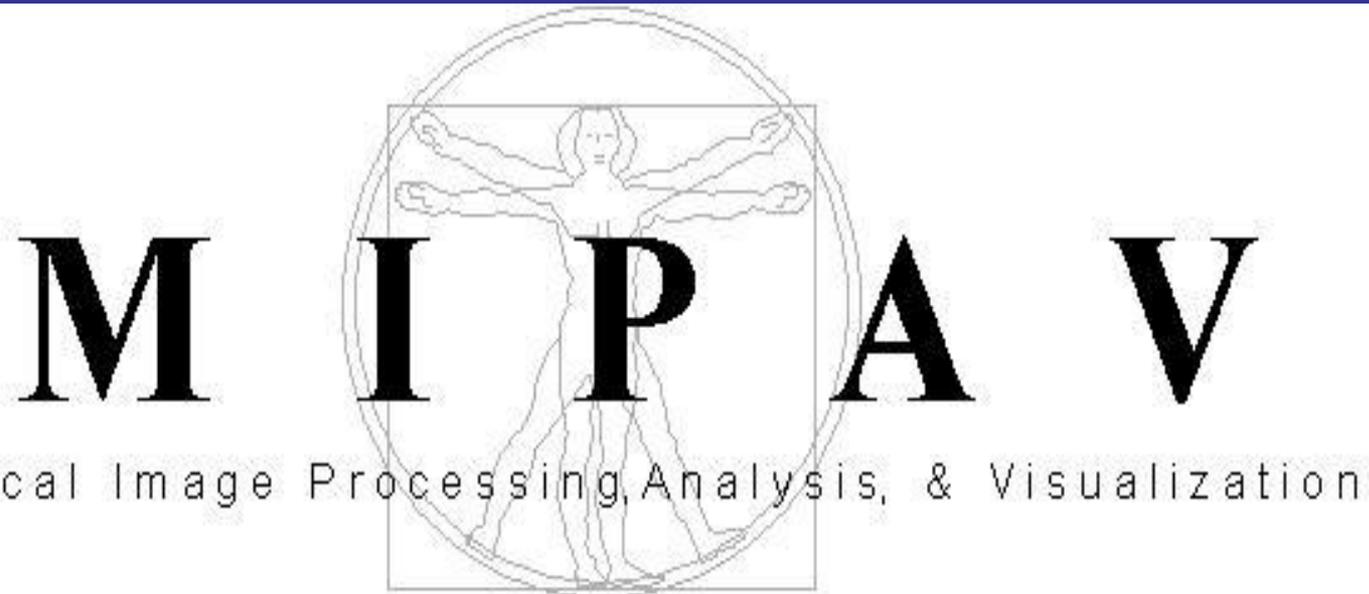
Summary

- Plugins
 - Unique functionality using MIPAV API
- Develop in Eclipse
- Use MIPAV API





<http://mipav.cit.nih.gov>



SenseneyJ@mail.nih.gov